TEACHING STRATEGIES USED BY GEOGRAPHY TEACHERS TO TEACH SUSTAINABLE DEVELOPMENT IN PINETOWN DISTRICT

BY

BUSISIWE TEMPERENCE MKHIZE

209514248

This dissertation is submitted in partial fulfilment of the requirement for the Master of Education degree in the discipline of Social Studies

School of Education, College of Humanities, University of KwaZulu-Natal, Durban, South Africa

Supervisor: DR D.W. Mncube

2019

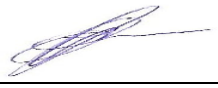
TEACHING STRATEGIES USED BY GEOGRAPHY TEACHERS TO TEACH SUSTAINABLE DEVELOPMENT IN PINETOWN DISTRICT

BY

BUSISIWE TEMPERENCE MKHIZE

2019

A master's dissertation submitted to the
Faculty of Education in fulfilment of the requirements for the degree
of
Master of Education
in the
Department of Social Science Education at the University of Kwazulu-Natal
Supervisor: Dr D.W. Mncube
Submitted: 2019

Signature: 

DECLARATION

I declare that this study titled ***Teaching strategies used by geography teachers to teach sustainable development in Pinetown district***, which is submitted to the University of KwaZulu-Natal for the master's degree has not been submitted by me for a degree at any other university, it is my own work, and all the resources that have been used or quoted have been indicated and acknowledged by means of complete references.

Researcher

B.T. Mkhize
mabeebm01@gmail.com

Supervisor

Dr D.W. Mncube

DEDICATION

This research is dedicated to:

- The memory of my late father, Eric Maniko Mkhize, and my mother, Nokwanda Magdeline (MaMchunu) Mkhize, who laid a strong educational foundation through sacrifices for me to get this far. She has been my source of inspiration in encouraging me to continue with my studies.

- My family (brothers and sister) Khulekani, Nomagugu, Mthobisi and Ntuthuko; not forgetting my nephew Busani and niece Azande. This shall serve as an inspiration to you. The sky is the limit! Work hard towards your dreams till they ALL come true.

For I know the plans I have for you, declares the Lord, plans to prosper you and not harm you, plans to give you hope and a future.

Jeremiah 29:11

ACKNOWLEDGEMENT

My sincerest thanks and appreciation are extended to:

- I would like to thank God the Father, the Son and the Holy Spirit for granting me His grace, His unconditional love, and the strength and guidance to finish this study.
- I am exceptionally thankful to my supervisor, Dr. D.W. Mncube, for his priceless mentorship and expertise in this study. Your professional guidance, motivation and support made this study possible. May the Father Almighty bless you abundantly with all that your heart desires. Thank you, Mhlekazi.
- My sincere thanks are extended to my family for understanding when I could not come home owing to research commitments, and for having such faith in me. Thank you for your support, Mom. This dissertation is for you.
- I would like to thank my fiancé, Zama Michael Ndlala, for his unfailing love, support, encouragement, and understanding throughout my studies. I love you, Tukane wami.
- I would like to thank my true friend, Nomzamo Mthimkhulu for her patience and understanding whenever I had to cancel our catchup sessions.
- Importantly, I would like to thank the participants who made themselves available for interviews and unstructured observations. This study would not have been possible without you.
- Finally, I would like to thank my colleagues, Mr. Naicker – thank you for your priceless advice and encouragement throughout this study and my Principal, who was always understanding when I had to take time off work to collect data.

ABSTRACT

Several researchers have noted that many learners do not practice what they have been taught at schools regarding sustainable development. This is evident as the environmental issues are continually increasing, and this threatens our existence. This study sets out to explore the teaching strategies that geography teachers use to teach sustainable development in Pinetown District. The main purpose of the study is to explore geography teachers' understanding of sustainable development and the different strategies that they use to teach it. The study purposefully targeted social sciences (geography) teachers in primary school.

This study is located within the interpretivist paradigm. The first research instrument administered was semi-structured interviews to solicit teaching strategies that teachers use to teach sustainable development and their conceptions about environmental issues. These were further explored by unstructured observations in class and around the school premises. Limitations, and recommendations for future research and more fruitful teaching of sustainable development were discussed in the last chapter.

The results revealed that teachers are facing challenges in instilling sustainability-oriented values. This is because there is no correlation with what learners are encultured with at schools and at home. Although most participants are keen on using technology to unpack sustainability, skills, and availability of resources to do so are limited. The critical analysis of findings further revealed that teachers use strategies that are convenient to them as time is limited by CAPS demands. Furthermore, the teachers involved in sustainable development initiatives are not necessarily geography (social sciences) teachers.

TABLE OF CONTENTS

ACRONYMS

ECE	Early Childhood Care
ECEFS	Early Childhood Education for Sustainability
EFC	Education for Sustainability
ESD	Education for Sustainable Development
ICT	Information, Communication and Technology
IKS	Indigenous Knowledge Systems
NGO	Non-Governmental Organisations
RCES	Resource Conservation Evaluation Systems
SBO	School- Based Organizations
SD	Sustainable Development
ZPD	Zone of Proximal Development

LIST OF FIGURES

LIST OF IMAGES

LIST OF TABLES

CHAPTER ONE

INTRODUCTION AND BACKGROUND

1.1 Introduction

In recent times, there has been growing public anxiety about the teaching and learning of sustainable development (SD) as a subtheme of geography in the Curriculum Assessment and Policy Statement (CAPS). Studies show that large numbers of school leavers do not have a basic understanding of SD imperatives as encapsulated in millennium developmental goals (Clugston & Calder, 2009. The quality of geography teaching and learning has also been under the spotlight over time as parents, environmental activists, non-governmental organizations (NGOs), school-based organizations (SBOs), the public in general and even the government question its legitimacy (Adriansen & Madsen, 2016). Geography teaching in South African schools has been criticized for paying lip service when it comes to how teachers teach the concept of sustainable development (Nicol, 2014).

Sustainable development is a powerful concept that bears international credence and is significantly responsible for championing environmental ethics and awareness in schools and other sectors of society (Brutland, 1987). However, scholars are questioning the relevance of teaching strategies used by geography teachers to teach this concept in the classroom setting, considering the unprecedented increase in cases of environmental disaster in recent years (Clugston & Calder, 2007; Lorr, 2012; Korobar & Siljanoska, 2016). The need to explore the effectiveness of the teaching strategies aligned to teaching sustainable development in geography cannot be exaggerated. It is a matter for regret that SD lacks relevance and social applicability, as learners do not practice what they have been taught at school in their lifestyles and in society (Borg, Gericke, Hoglund, & Bergman, 2012).

Other studies have mentioned that poor classroom organization, lack of management techniques, and poorly coordinated student activities also detract from teaching strategies for teaching environmental concepts (Wakefield, 2003). Nicol (2014) found that lack of financial support for teaching equipment and environmental material for practical work inhibits creativity in selecting relevant teaching strategies. Some other researchers attribute the lack of understanding of SD to teachers' professional training, workload, inexperience, disposition, general lack of teaching skills, and ineffective style of delivery of subject matter (Nicol, 2014).

Schools need to improve the quality of geography teaching and learning about SD for citizens to develop the basic environmental literacy the country has been yearning for decades. Considering the strides made internationally on this subject, the need to involve stakeholders in geography education in identifying potential teaching strategies for improving the quality of teaching and learning of SD in South African schools is of paramount importance. The exploration of potential teaching strategies that can help citizens to become more environmentally literate is widely acknowledged as a cornerstone of education for sustainability.

1.2 Purpose and focus of the study

There is an increasing need for sustainability awareness programmes to be introduced in schools through the eco-school programmes. This is due to the escalation of environmental consequences that damage our lives, such as climate change. Therefore, the purpose of this study is to explore geography teachers' understanding of sustainability and the different strategies that they use to teach it.

1.3 Background and contextualization

Schools remain the ideal setting through which responsible citizen can be harnessed in order to preserve environmental integrity (Lorr, 2012). Pedagogical content knowledge, together with progressive teaching strategies, is the vital force for geography teachers in the quest to promote environmental sustainability, accountability, and ethical behaviour. Educational policy in South Africa has advocated for the strategies that will allow the implementation of these practices on a meaningful scale (DBE, 2013). In essence, sustainable development as a concept is context-dependent in economic, social, cultural and environmental situations (Lorr, 2012). The report compiled by Brutland (1987) defines sustainability as development that meets the needs of the present without compromising future generations' ability to meet their own needs. Practically, sustainability is the creation of a social norm starting from the school premises and broadening out to the wider community (DBE, 2013). When initiating sustainable development programmes, the introduction of ethical principles within education to safeguard the environment is paramount (Diesendorf, 2000). The strength of teachers' pedagogical content knowledge has a significant impact on how awareness for sustainability is raised in schools.

1.4 Motivation of the study

Sustainability is a priority interest for many organizations because it affects us and the future of the world in one way or the other. The researcher has always been interested in teaching about environmental awareness and instilling its values in learners and the community at large to make them understand the importance of, and the responsibility we have towards, conserving and appreciating the environment. In the researcher's observation during her teaching practice, she noticed that geography teachers did not emphasize the importance of SD when they taught sustainability themes in the classroom, and of implementing sustainability measures in the school at large. I felt that sustainability needed to be practised in the school environment so that learners could be encultured within the school, and be taught to make a difference on a smaller scale to be able to apply it in their communities.

In the school where the researcher did her teaching practice there was a dumping site, and no litter bins provided, or other recycling measures implemented within the school environment. That prompted her to have an informal conversation with the geography teachers, and that was when she realized that they had only a vague idea about sustainability. Her greatest concern was the gap that existed between content and practice. Hence, the question arises: "Do teachers understand what sustainability entails, and do they have sufficient teaching strategies to equip learners with purposeful knowledge that will lead to change within the school environment?" According to Semali (1999), there can be no happiness if the things we believe in are different from the things we do. Learners are taught so that they can apply their skills and knowledge to make our world a better place to live in. Learners seem not to be practising what they are being taught at school. According to Lorr (2012), efficient development is not likely if knowledge is not put into practice. However, it is also important to ask, "Are the teaching strategies effective?" There is no doubt that teachers' knowledge of sustainability, and the manner in which they instil that knowledge, are important areas of inquiry. The aim of any lesson delivered by a teacher should be for learners to apply the skills for their own benefit and the development of the community at large.

1.5 Rationale of the study

Sustainability is an important national issue in South Africa and around the world, with many conferences on it which aim to tackle formidable issues such as continual environmental

degradation and urge countries to comply with sustainable development protocols. The framework to enforce Section 24 of the Constitution is the National Environmental Management Act (Act 107 of 1998), NEMA, which is the national environmental management authority in a progressive environmental management programme in South Africa. It is important that South Africa comply with this Act to ensure that sustainability is maintained. Failure to comply leads to a broader global problem, which is climate change that eventually leads to global warming.

It is important to clarify that this study is not about teaching sustainability. Rather, it seeks to explore geography teachers' understanding of sustainability and their ability to use various teaching strategies to teach sustainability in schools. In essence, findings and results that will be generated may not be only for the benefit of the researcher, but will enable geography teachers, subject advisers and other relevant stakeholders to extend their knowledge and professional competence in order to improve the teaching strategies that they use to teach sustainable development which could benefit learners and the society at large.

1.6 Statement of the problem

The magnitude of environmental disasters that are linked to human ignorance is growing in a proportion never seen before, which affects many developing countries like South Africa. Therefore, an investigation into creative teaching strategies to teach SD in geography provides a distinct milestone towards achieving a just environmental literacy in schools. Education for sustainability is seen as a vehicle for raising environmental awareness and enabling geography teachers to improve their skills (CAPS, 2011, p. 31). Teaching sustainability requires nuanced and constructive teaching strategies such as practising sustainability within the school environment; this may improve the level of confidence for teachers to teach sustainability effectively in schools for the benefit of local communities. This study seeks to explore teaching strategies used by geography teachers to teach sustainable development concepts to learners. One needs to conceptualize this study in terms of integration of pedagogical content knowledge into teaching sustainability.

1.7 Location of the study

The research study will be conducted in a school located in the Pinetown district in KwaZulu-Natal province. This school will be termed in the study 'school A'. The study will focus on three geography (social sciences) teachers.

1.8 Research questions

The following questions will be asked in this research:

1. What teaching strategies do teachers use to teach sustainable development?
2. How do teachers use teaching strategies to teach sustainable development?
3. Why do teachers use teaching strategies to teach sustainable development?

1.9 Research objectives

1. To explore the different strategies that teachers use to teach sustainable development.
2. To understand how teachers use teaching strategies to teach sustainable development.
3. To understand why teachers use teaching strategies to teach sustainable development.

1.10 Significance and the value of the study

This research study could be a useful reference for future researchers. The study has shed some light on the teaching strategies that geography teachers use to teach sustainable development. The outcomes obtained from this study will be important to help teachers in exploring the different strategies that they can use in their classroom.

1.11 Contribution of the body of knowledge

If the present study is not pursued, geography teachers will not be enlightened about the different strategies and they can use to teach sustainable bearing in mind that sustainable development is a practical concept. The results of this study will add value to strategies that are suitable to teach sustainable development and the projects that schools can start to save our earth. The information will be disseminated in the forms of a dissertation, journal articles and conference presentations. This study will benefit not only geography teachers but all teachers who teach this concept in their subjects.

1.12 Definition of terms/ concepts

This study contains certain key concepts. Although these concepts are discussed in chapter two, they are briefly defined in this chapter for the reader to make sense of what is presented in the subsequent chapters.

1.12.1 Sustainable development

This report defined sustainable development as development that meets the needs of the present generation without compromising future generations to meets their own needs (United Nations General Assembly, 1987: 43). In support of this, Stiddart (2011) and Diesendorf (2007) argue that this definition emphasizes the long-term aspects of the concept of sustainability and it introduces the ethical principle of achieving equity between the present and future generations. This study uses this term to refer to the interrelationship between the economic, social, environmental and cultural aspects of sustainable development. Therefore, the aim of sustainable development is to promote the preservation and minimise the degradation of the environment through the integration of various stakeholders involved in saving the earth and our lives.

1.12.2 Teaching strategies

Teaching strategies refer to the methods that teachers use to unpack the content to accomplish learning (Christie, 2008). Real world problems are inherently engaging since they tend to be meaningful and applicable to students' lives, either directly or indirectly. Multiple pedagogic strategies can be used to incorporate real examples into the classroom. These include teaching with case studies or with investigative cases, field experiences and engaging students in community work, such as service learning would have a positive impact on their attitude towards conserving the environment

1.12.3 Environmental Education

Environmental Education is critical for promoting sustainable development and improving the capacity of people to address environmental and developmental issues (UNESCO, 2005). Meadows (1990) defines environmental education as learning to protect the environment by thinking and acting responsibly towards the natural environment. This is done by considering the history, the values, perceptions, emotions, techniques and the traditional processes that cause this tremendous damage and suggest action to bring about the solution to these problems. Contemporary environmental education is an approach to education that seeks to interest and involve students in world problems. The mounting social concern over environmental matters

makes it vitally important that education addresses this major contemporary issue and that the p0otential impact of environmental issues on the future is assessed. To achieve this, schools should provide learners with necessary skills infused within the school curriculum the report makes it clear that these "needs" include the conservation of the natural environment. Abbot (2001) states that sustainable knowledge is the predicament that manifests itself in a number of ways and lacks social practice at large. Hence, environmental work will need to be relevant to the student so that they can actively practice it in their homes or society at large. Through increasing their understanding of themselves and the world around them.

1.12.4 Sustainability

Sustainability is a process of maintaining change in the environment, in which the exploitation of resources, investments, technological advancement infrastructural development are all balanced and enhance both the current and future generations to meet their own needs (Susan Strife, 2010). Sustainability is a global goal, its problems, and solutions that are always importantly situated in local ecologies and communities. Sustainability suggests ways to reorganize the economy, environment, society, and education because it provides a democratic means of providing values such as taking responsibility for our actions and also for making the right choices. Therefore, this assertion underscores the importance of problem-solving and critical thinking skills to encourage learners to become more engaged in environmental citizenship and decision makers (Susan Strife, 2010). There are numerous positive outcomes when children are exposed to nature and environmental based instruction**.** According to Susan Strife (2010), nature and environmental experiences have also been shown to encourage a child's social skills by improving language abilities, which endangers social relationships (Susan Strife, 2010).

1.12.5 Geography

Geography is a subject in schools Geography is the study of places and the relationships between people and their environments. Geographers explore both the physical properties of Earth's surface and the human societies spread across it.

1.13 Outline of chapters

- **Chapter 1-** This chapter provided an introduction to the study and the driving force for the study to be conducted.

- **Chapter 2-** This chapter begins by looking at the theoretical background to conceptualize the study in a broader context. The driving force in this chapter is the available studies on teaching strategies that geography teachers use to teach sustainable development. Different strategies were explored and presented.
- **Chapter 3-** This chapter outlines the research process and the stages of the research process. This section is important to critically reflect on how the research was collected and unpack the relevance of the chosen research style for this research.
- **Chapter 4-** This chapter presents the findings of the study in detail. The findings will illustrate the themes of the response to the research questions that were posted earlier to guide the research findings.
- **Chapter 5-** This chapter concludes the study by looking at the limitations of the study and the recommendations for future research.

1.14 Conclusion

This chapter has provided a synopsis of the study. This chapter looked at the main purpose of the study and the research questions together with the research objectives that underpin the study. Furthermore, the rationale for the study was outlined. Key terms and an overview of the chapters were outlined.

CHAPTER TWO

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 Introduction

The driving force in this chapter is the available studies on the various teaching strategies that teachers use to teach sustainable development. In this chapter, at first, the theoretical framework is examined. Thereafter, the concept of sustainable development will be unpacked. Thereafter, the various teaching strategies are outlined, and how they are used to teach sustainable development. This is followed by examining how sustainable development should be taught, and this will be done reviewing at the CAPS document. From there, I move on to review the literature regarding ethics and indigenous knowledge in teaching sustainable development.

2.2 Defining sustainable development

One of the international goals for the future is the construction of a sustainable society. A sustainable society is considered a society that has reached sustainability through the process of sustainable development. In 1987, the Brutland Commission published its report on "Our Common Future", to outline the dependence relationship between economic development and environmental sustainability, which are both essential for our survival. This report defined sustainable development as development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs (United Nations General Assembly, 1987, p. 43). In support of this, Stoddart (2011) and Diesendorf (2007) argue that this definition emphasizes the long-term aspects of the concept of sustainability, and introduces the ethical principle of achieving equity between the present and future generations. However, the report makes it clear that these "needs" include the conservation of the natural environment. Therefore, learners in schools are taught skills on how to conserve the environment through geography and environmental awareness campaigns. Hence one may question if learners are practising what they are taught at school in society at large. In response to this question, Shiva (2003) clearly outlines that the Brutland Report "provides a framework integration of environmental policies and development strategies" (United Nations General Assembly, 1987); therefore, practising what is taught at schools comes with personal, societal and cultural values which influence attitudes of learners towards the natural environment. On

the other hand, Abbot (2001) argues that sustainable knowledge lacks relevance and social applicability as taught at present in schools. It is disturbing to note that learners are not practising what they have been taught in school because they do not have the skills and motivation to have a positive impact on the world. This is evidence as environmental degradation is increasing at an alarming rate (Emas, 2015). UNESCO (2005) stated that education for sustainable development is about enabling people to constructively address present and future global challenges and create a more sustainable and resilient society. Gans (2016) argues how individuals and institutions imagine and construct their future lives and the world. Therefore, understanding future constructions and their differences across the boundaries of class, gender, race, generation window, and other social markers provide a window into both conflicts of the present and new possibilities (Gans, 2006). Sustainable development as a concept is heavily context-dependent in economic, social, cultural and environmental situations. Hence the integration of these principles is essential in the decision-making process.

2.3 Definition of teaching strategies

Teachers are learning mediators, which means that they need to have strategic ways of making sure that information is transferred and is understood (Christie, 2008). This can be done by interpreting and implementing learning programmes and materials that are essential (Christie, 2008, p. 23). Teaching strategies refer to the methods that teachers use to unpack the content to accomplish learning. According to Williams (2002), it is the interaction between subject matter and methods of instruction. However, teachers emphasize various learning experiences and use a variety of materials based on their skill and interests. The teaching process requires teachers to "transform" their subject matter knowledge for the purpose of teaching environmental literacy themes (Shulman, 1986). This transformation should occur during teachers' critical reflection as they attempt to interpret the subject matter. In this regard, they tend to find multiple ways to represent the information as analogies, metaphors, examples, problems, demonstrations, and classroom activities. This resourcefulness will enable them to adapt the material to students' developmental levels and abilities, prior knowledge, and misconceptions.

It is important that teachers choose to teach strategies that are of positive influence on the lesson and facilitate learning (Shulman, 1986). Their strategies must instill the educator with the

culture of learning and doing research to the benefit of both the learners and the educator. Learners should be taught and to realize that what they do has an impact, and they can make a difference. A 15-year-old asked in an interview about sustainability: "What could we do to make the school environment better?" The student seemed to think: "Well, I can make a difference if I do something on the local scale," that is, by beginning with a change of attitude towards preserving the environment (Stone & Barlow, 2009). Currently, various teaching strategies are used to unpack sustainable development within the curriculum.

2.4 Sustainability in the curriculum

Geography education is an important tool that is applied in the contemporary world, to succeed, as it mitigates the challenges which are faced in life and plays a pivotal role in developing individuals based on their everyday experiences (Uitto & Solaranta, 2016). Environmental education is an integral part of South Africa's National Curriculum Statement (Rosenburg, 2009), yet few teachers have a background in environmental education. The Geography teachers, however, do have a background in environmental education. The geography curriculum can promote learning across the curriculum in several areas such as spiritual, moral, social and cultural development, and in key skills, and including thinking skills. The aim of the geography curriculum is to create the type of learner that can identify and solve problems, make decisions using critical and creative thinking, to be able to work effectively as an individual to collect, analyse and interpret information, and sustain a commitment towards sustainable development (Uitto & Solaranta, 2016). It is evidence that geography is a multidisciplinary subject that develops pupils who can analyse and understand the world around them; this results in ability and willingness to take positive action, both locally and globally, as geographers are the agents of change.

Many policies have been developed across the world to make teaching and learning possible and efficient, but the greatest challenge is the implementation of these policies (Schulman, 1986, p. 93. Schulman (1986, p. 93) stated that teaching is characterized as "the practice of organizing systematic learning". This statement is problematic because it does not take to account the external variables such as the classroom size, the number of learners, the availability of resources and the social background of learners (Morrow, 2007). It is difficult to organize systematic learning in this context and these conditions because all the programmes of teacher education typically assume a relatively stable schooling system with relatively

predictable roles for teachers in that system (Schulman, 1986). As a result, teachers have an added responsibility to try and overcome these conditions by trying to get alternative means to teach, and this is done by critically analysing the roles of teachers.

The first is expressed by teachers in this research in terms of understanding the complexity of sustainable development issues, the nature, and interconnectedness of its sub-concepts, and its value-laden nature reflected in contested meanings and differing aims. These are similar in nature to features of the subject matter described in the literature from Capra (2007) and noted in the conceptual background. The second is the teacher's recognition that the complexity of subject matter to do with sustainable development, including its associated concepts, presents challenges when thinking about how to teach this area in secondary schools. Many teachers feel that it is not their responsibility to implement the practicability of sustainability (Morrow, 2007).

Stone and Barlow (2009) argue that there are major themes that need to be dealt with in secondary schools. The two major themes need to be dealt with in secondary school include the interrelationship between society or the environment at the global level and adequate analysis of the philosophical dimension of this relationship. Knowledge at the global level is necessary to understand international protocols and the interdependence between local and global political decisions (Summers, Corney, & Childs, 2004). Furthermore, an analysis of globalization as an economic process will help to develop an understanding of the value of unified planning in dealing with environmental problems. The geography curriculum will then be completed by a philosophical reflection on the relationship between society and geographic space because this will allow the students to become more aware of the use made of resources and of the importance of the environmental context for society (King, 2006). In this way, they will acquire an understanding of sustainable development in a way which is appropriate both for society and for the natural environment. The students should, in the final stages of the educational process, possess the tools necessary for analysis and interpretation of environmental problems from the scientific, economic and political points of view. Finally, students should be exercised in the elaboration of functional interventions, by an appropriate use in their work of the language of cartography and information science. Below are the various teaching strategies used to teach sustainability.

2.5 Teaching strategies

2.5.1 Whole class discussion

It is important that teachers choose teaching strategies that are of positive influence on the lessons and facilitate learning (Shulman, 1986). They must instil in both the learners and the educators the culture of learning and doing research. Learners should realize that what they do has an impact, and they can make a difference. Asked in an interview about lessons with 15 year old students on "what we could do to make the school environment better", the respondent had observed that "through this work, students seemed to think 'Well, I can make a difference if I do something at the local scale level,'", that is by beginning with a change of attitude towards preserving the environment (Stone & Barlow, 2009). Many teachers teach using whole-class discussions. This is the most implementable strategy because many teachers face the challenge of overcrowding, and some strategies are easy to maintain because with overcrowding there is also a discipline issue.

Moreover, according to Stone and Barlow's study, it is challenging to facilitate discussion in a way that makes everybody feel that their opinion is valid. And explained in an interview from one teacher, some parts of geography are less uncontroversial: for example, explaining coastal processes, in explaining such as how long-shore drift works. In this case, a discussion in unnecessary, but other strategies are important in ensuring that the coastal processes are understood. This entails that certain topics need certain strategies to teach it to them. Many teachers teach only using the textbook, which is difficult to understand and is more theory-based. On the other hand, there are learners who learn by seeing and listening, hence other resources to enhance understanding are essential. With regard to sustainable issues, they are more engaging and experiential since we face them in our societies every day. Sustainable issues get pupils to think, debate and justify their views based on what they have learned and what they see, so they can develop their ideas.

2.5.2 Fieldwork

Many learners do not get the chance to be exposed to the environmental issues: some learners have never seen a polluted river or a dumping site, and even if they know about them, they do not understand what they imply. Fieldwork as a pedagogical method has been shown to benefit students' cognitive skills and motor coordination, and facilitate interest and enhance knowledge acquisition and understanding by situating learning in context and providing

opportunities to transfer and apply prior knowledge (Nicol, 2014). This constituted an important part of the proposed learning activities in this study.

Sustainable education demonstrates the powerful effect that environment-based education and exposure to nature has on student's cognitive, emotional, physical, and psychological development (Shiva, 2003). Hence this Education for sustainable Development (ESD) programme was planned and implemented to investigate how place-based education promotes student test scores and overall motivation for learning about nature. Visits to places of environmental concern provide the best opportunities for learners as a means of observing and experiencing the real environment. They have enough scope for building environmental awareness, stimulating participation and developing investigative skills in learners (Davis, 2010; Susan, 2010).

Students reflected on the transformative potential of the field school, confirming observations in the literature, but also providing nuanced reflections specifically with respect to learning for sustainability. For many students, the field school was "unexpected," "formative" or "eye-opening", as it challenged assumptions about formal learning, and ultimately empowered them to undergo significant behavioural changes in their personal lives and communities (Mezirow, 2000). Students reflected on the power of immersion and continuity; of direct experience and emotional learning; of being part of a supportive learning community and of place-based learning, story, for an example. These themes capture, to some extent, students' interpretations of the multiple (and often conflicting) instantiations of sustainability they encountered throughout the school field. While there is only space for cursory consideration here, readers are encouraged to visit our website for reflective videos on the student experience.

The field study also enables the development of a learning community through social learning and peer support. Mitussis and Sheehan (2013), for example, actively encourage "collusion," where students reinterpret sites and make sense of their experiences collectively. In our study, students emphasized their appreciation for collective learning, which they often contrasted with the secretive and competitive conventional class environment. Andrew appreciated meeting, travelling, and learning with others who had similar interests and concerns around sustainability. Such reflection, in turn, made him aware of the typically isolating experience of conventional learning. Collective learning took place not only through structured fiactivities but also over a beer, by cooking together or exploring the city on foot. Students identified the

rigours of travel and a sense of "shared adventure" as inspiring group cohesion and emotional connection that further augmented learning. It was not lost upon students, such as Sarah, how "the field school itself was a little community," which could provide insights into broader societal challenges and opportunities. Some students recognized their own social learning-experimental and communal in contrast to the individual, expert-lead (Capra, 2007), correlated with the learning required of sustainable communities. Shurmer-Smith (2002) suggest that instructors should act as facilitators instead of dictatorial imparters of knowledge, the field school enables instructors to partake in community-based learning. Here, the community consists of a group of students, teaching assistants, and professors, as well as planners, academics, and other citizens we connect with.

In Alexander's (2014) study, visits to natural areas are organized for experimental group students to discover nature through their senses. During such visits, various games are conducted that involve touching and smelling of various plant species, hearing the sounds and observing various birds and insects in the botanical garden (Behrendt, 2003). The students took samples (when appropriate) and recorded their experiences by means of drawings, sound recordings, and writings. Negative attributes, for example, littering, injuring fauna, plugging flora) had been discussed in the classroom before the natural visits as well as in the field. These activities helped students to value natural areas, such as the ones visited, and develop positive attitudes regarding their protection. This proves that learning can successfully take place out of the learner's usual environment. On the other hand, some teachers avoid taking learners to field trips because of the cost implications and because they are accountable for the safety of the learners, it is difficult to look out for many learners.

2.5.3 Role play

Experiential learning theory (Semali, 1999) suggests that students learn more effectively by "doing" than by "listening" (for example, by activity rather than passive rote learning), and this is a major strength of learning in the field where students are involved in environmental projects, data collection, and analysis. In addition to the direct educational benefits, fieldwork has been reported to increase confidence and motivation (Boyle & Biklen, 2007). The environmental philosopher, Stone (2007), emphasized that the people will act on behalf of the natural world if they have exposure to it, therefore knowledge about natural entities is essential. It is now well established that knowledge about the natural world will influence attitudes

regarding the natural that world, which will, in turn, impact influence one's actions on its behalf. of the natural world (Goralnik & Nelson, 2011).

A study conducted by Mackenzie and Edwards (2013) emphasized that play-based education must be integrated into environmental education. The use of drama and role play is used as a strategy to develop students' understanding of basic environmental and ecological concepts (Stone, 2007). Different types of drama and role play were used to raise various concepts of environmental awareness such as conservation of wild animals, birds, and natural resources. After the end of each activity, students were asked to write down their ideas expressing their perceptions, feelings, and experiences about their environment. Hands-on learning is another instructional technique where students manipulate the laboratory materials to help develop an understanding of the concepts related to environmental problems.

Some teachers believed that sustainable development is too difficult to grasp, and some felt that topics like global warming are taught in science, and do not need to be taught in geography. In regard to teaching and learning approaches, some teachers were uncomfortable teaching about controversial issues, especially to lower ability classes. This states that they themselves do not understand what sustainability is and how it can be implemented. Therefore, role-play activities have been developed to allow learners to express themselves. The experiential teaching methods have been shown to follow and stick to too many of the principles of constructive teaching. According to Stone (2007), the drama is a useful tool as its processes mark it out from other approaches such as discussion, the use of video, and didactic pedagogy. Drama ensures that children are actively and creatively involved in problem-solving situations. The drama also helps learners with difficulty to overcome the challenges of public speaking and any other associated challenges. Morgan and Saxton (1987) support this idea: they see drama as the way that will able learners to construct their own understanding, view and analyse the world we live in, and be able to learn to understand themselves. In reference to the DoE (2002, p. 26), one of the many outcomes of geography teaching is that it aims to empower learners in making to make their own responsible decisions. An educator can use drama methods and create a context where these aims are achieved. Drama experiences have been shown to benefit learners in several ways. Drama provides learners with distance and space to reflect on their actions and thoughts (Wagner, 2009), and allow educators to see if they should continue with their current teaching method or come up with a new teaching method for the

next lesson. For example, an educator might ask learners to work in groups and present a play based on the measures that can be taken to practise sustainability.

Drama can be adapted more especially to the schools for learners with special needs. Wagner (2009) states that drama teaching methods are more accessible to non-verbal learners. The learners will more easily understand what they have seen or experienced than what is orally said and presented to them. Drama is a learner-centered, constructivist approach. Perry (2008) states that drama encourages learners to work cooperatively. This will make it easy for the educator to see which group is working and which group is not. The focus of the educator will now be perhaps four groups in the class instead of 45 individual learners. The learner's voice during this play will be heard. This teaching method allows all the learners in the classroom to participate, even those who are very shy to speak: even though they have the answer, they will not raise their hands. Diemont (2003) states that drama allows authentic voices to be heard through a role. This will allow the opportunity for their true voices to be listened to (Diemont, 2003). In addition, different ideas about sustainability measures can be shared and realized through a role play scenario.

Diemont (2003) and Goode (1982) argue that drama-teaching methods encourage creative problem solving. The different drama teaching methods will allow both the educator and the learners to find solutions to the challenges that they face in the school that affect the process of teaching and learning. For an example, sustainability in the school, teachers assess the learners orally on how the sustainability issue affects them and how much it disturbs their learning programme, and the teachers might relate to that to find the solutions to how they can avoid disturbances that hinder the process of teaching and learning. I think those are the most important points to consider. On the other hand, Herrick (2010) states that environmental service-learning projects can facilitate hope-based learning. Hope-based learning is fostered when students leave the experience feeling more capable of making a purposeful change, which will be increasingly important to foster as we spiral through the broad array of deepening, disheartening ecological crises we now face, such as climate change, ocean acidification, and water shortage.

So many positive outcomes can come out of using different dramatic methodologies in teaching. This will provide opportunities for learners to explore roles and attitudes – they can take any role that they find comfortable and perform it (Mitchell, 2014). This can be done by

designing a sustainability project to target a certain sustainability issue in such a way that different voices or viewpoints are available to the learners through independent research that learners had acquired through interviews and what they are experiencing in their communities. Watts and Becker (2008) assert that one can make learning enjoyable and enhance learners' commitment and improve learner's motivation to the culture of learning about sustainability.

2.5.4 Content teaching strategy

The content of the subject matter is the core of learning. A content teaching strategy is a content-centred approach which entails that teachers should use the CAPS document and stipulated resources to teach (Killen, 2000). The content that is prescribed by the policy documents has different outcomes for each of the topics that are covered in teaching sustainability (Killen, 2000). However, this strategy lacks innovation, as we find that teachers are not using engaging or practical strategies to teach. Instead, they rely on textbooks to teach learners. There is a critical need to confront an historical assumption in the curriculum that there are two distinct categories of learners in schools (Christie, 2008): that is, those learners who form the majority with "ordinary needs", and minority of learners with "special needs", who require support or specialized programmes in order to engage in some form of learning process (Hargreaves, 2007, p. 119). Hargreaves states that: "a unified system of public education is one that incorporates meaningful curriculum, effective teaching and necessary supports for each student." (2007, p. 115).

2.5.5 Socially transformative approach

According to Vygotsky's (1978) theory of Zone of Proximal Development (ZPD), learning has a social quality. As learners listen to the discussion, they can think along by recalling their experiences. In support of this, Piaget (1977) observed that social interaction is a key to learning. Hence, Hargreaves (2007) argues that learners must interact with the information to the extent that they are able to manipulate and use it to come up with strategies that are critical in addressing individual or societal challenges. According to a behavioural perspective, learning can be defined as an observable change in behaviour. One element of the theory is the transfer of learning, and this implies the application of something learned in a society (McKool & Gespass, 2009). Teaching sustainability requires teachers to help learners develop an understanding of our social and ecological interdependence. This requires teachers to model the values and principles of empowerment and social responsibility. It is expected that this

educational effort will encourage and generate changes in behaviour that will create a more sustainable future in terms of environmental integrity, economic viability and society for the present and future generation (UNESCO, 2005, p. 5).

Social critical sustainability education encourages teachers to also provide learners with opportunities to do something for the environment, as it helps to build not only a critical understanding of these issues but also commitment and values, as well as skills (Rosenburg, 2009). Wals (2007, p. 5) emphasizes the value of the process to work through the different views and values in a group, particularly among people with diverse backgrounds, and different interests in the issue of sustainability. Rosenburg (2009) further asserts that we cannot always learn more by simply drawing on what is already in our minds. We may need new information or practical tasks that help us to generate a new understanding. Wals (2007) asserts that education for sustainability (EFS) focuses on the interactions between people and people, and how these interrelationships affect the integrity of the environment and its functioning. This requires a deep understanding of ourselves, our neighbours, our societal and cultural processes, and how we relate to the ecological systems for life (Lang, 2007; Davis, 2010). Lang (2007) asserts that transformative education is founded on principles of critical inquiry, empowerment, participation, democratic decision making, and the taking of action that supports sustainable development.

In addition, Davis (2010) argues that the crisis of sustainability cannot be solved by the same kind of education that has helped to create the problem. This orientation requires education for sustainability to be implemented in such a way that it develops systematic curriculum, pedagogy and policy responses that go deep and wide (Shulman, 1986; Davis, 2010). This orientation is aimed at overcoming the fragmented, shallow and inconsistent approaches that are too often implemented in educational settings. As growing international evidence indicates, an important element of a systemic approach is for EFS to be enacted through "whole" setting approaches (Mutussis & Sheehan, 2013) that aim to transform current, unsustainable ways of thinking and acting with embedded "cultures of sustainability" (Davis et al., 2010). Davis et al. (2010) assert that early childhood education can showcase education for sustainability in empowering child-focused and authentic ways that have a ripple effect into the communities.

If you are thinking a year ahead, sow a seed.
If you are thinking years ahead, plant a tree.
If you are thinking a hundred years ahead, educate the people.

(Chinese poet Kuan Tzu, 500BC)

Davis (2010), argues that early childhood educators should become engaged with education for sustainability initiatives. This can be done by incorporating EFS in the foundation curriculum and pedagogy (Davis, 2010). Nevertheless, it is a mistake to think of children only as victims in the face of present and future sustainability challenges. With support, protection, and education, young children can be extraordinarily resilient and positive about the state of the world and their place in shaping it. Moreover, there is growing evidence internationally of the benefits of children and young people being educated as active and informed participants who can respond to, and shape, the challenges in their lives (Behrendt, 2003). Even the very young can contribute ideas, energy, and creativity towards the management and solving of local issues (Bartlett, 2008). This is where EFS plays it part.

As a matter of fact, sustainable development issues and topics are already a part of children's lives. Many children have already seen graphic images on television of saving endangered animals, choking smog and urban slums. They also hear conversations and debates about these topics in the news, within their families and at school or in communities at large. Davis (2010) asserts that learners should not be underestimated, as we do not know what ideas, impressions and contributions about the environment, social justice, and the future young children are formulating. Hence, education that delays learning about such issues and topics reveal a "blind spot" about the realities of children's lives and their ability to understand our complex world (Davis & Elliot, 2009).

2.6 Education for/about/in sustainability

According to National Environmental Education Project for General Education and Training (NEEP-GET, 2005), the way educators teach influences learners values and worldviews. This principle highlights the importance of the environment in the classroom, as well as the broader environment. Environmental education seeks to enable broader structural and social change towards sustainability. This notion implies that environmental education should nurture a new ethic that requires critical thought about the role, nature, and potential of environmental education as a transformative agent of personal, social and planetary change (Semali, 1999). The emerging implication is that educators need to explore the idea that how they teach is as important as what they teach.

EFS is concerned with social action for change (Davis, 2010). It involves the critical examination of existing practices, collaborative problem solving and acting to introduce resource-efficient strategies. EFS challenges educators to develop learning processes that prepare learners to be active, responsible citizens who can make better lifestyle choices and challenge ways of working and thinking about the world. Since learners spend most of their time at school, teachers and learning communities are key components in the dissemination of those sustainability principles that will lead to the necessary changes in attitude (Cambers, 2008). Teachers play a key role in the appropriate socialization of young people for sustainable development. It is important that irrespective of the academic subject matter for which a primary or secondary school teacher is responsible, the teacher's major overall responsibility should be the moulding of socially and emotionally well-adjusted individuals (Hargreaves, 2010).

On the other hand, education in sustainability (EIS) employs the natural environment as a medium of learning, giving high priority to the outdoors as a setting and learning resource (Davis, 2010). This includes exploration of the outdoors, nature studies, presenting nature through art, gardening and playing with natural materials. It seeks to provide foundational experiences that put children in touch with nature to foster wonder, empathy, and love for the environment. Early childhood services are quite good at offering opportunities for young children to play in the environment, though there are growing concerns about playing outdoors, and growing teacher anxiety about litigation in case of accidents when children go outdoors.
Furthermore, education about sustainability (EAS) encourages children to appreciate the importance and complexity of the natural world and the interconnections between human and natural systems. Science learning provides a basis for scientific knowledge and the acquisition of foundational scientific processes such as observing and inferring, which underpin education about the environment (Louv, 2005). Learning about the environment is also undertaken reasonably well as learners are given a solid foundation by investigating natural entities. In contrast, Davis (2010), argues that educating in and about sustainability is not enough for laying the foundations for sustainable living. This is because education in and about the sustainable environment fails to address human-environment interactions, as more attention is given to the natural environment and less is given to social and cultural perspectives such as indigenous practices. This accelerates environmental and sustainable development problems. Environmental issues are further deficient theoretically and practically in empowering current

citizens to be agents of change. Hence, EAS is transformative education that instils values and encourages and supports children to be problem seekers, problem solvers and takers of action in their own environments. The relationship between humans and nature has evolved over the years. Elliot (2008) argues that rapid human population growth is the key determinant of the global environmental crisis and an aberration. This is because an increase in population is aligned with high employment rates, pollution and depleting of resources since there are people's needs to be met such as more housing, better transport facilities, and more food.

Louv (2005) coined the phrase "nature deficit disorder" to describe the disconnection of children from nature. Nature deficit disorder describes a generation of children so disconnected with nature that they experience symptoms such as diminished sensory use, attention difficulties and emotional illnesses (Louv, 2005). Hence, early childhood educators understand the significance of connecting with nature, with play being regarded as the predominant vehicle for learning in early childhood (Elliot, 2008). Thus, educators have a significant role in promoting the value of free time to play, particularly outdoors, in the increasingly hurried lives of children and families.

Teachers need to be trained about the use of the appropriate teaching strategies to use for each level and be able to engage the learners according to their development level (Hargreaves, 2010). It can be stated that teaching provides learners with strategies on how to make healthy choices that contribute to a meaningful life and a healthier society. A lifestyle choice is a personal and conscious decision to act in ways that may positively or negatively affect the environment. Teachers can use multiple strategies to create this environment, but the school garden has proven to be a very useful tool (King, 2006). Given this emphasis, it is not surprising that the conception of sustainable development used by geography teachers in their teaching relies heavily on the Brundtland Commission Report. According to Wilson and Shulman (1989), teaching sustainability is a civic project. This entails that what learners are taught at school must be applicable to society at large. This highlights the importance of resource-based learning. Russo and Sisitka (2003) argue that educators must provide learners with adequate resources to help them learn more about what they already know. These resources can vary from comprising books, the internet or a visit from a sustainability activist in the community.

2.7 Leadership and culture

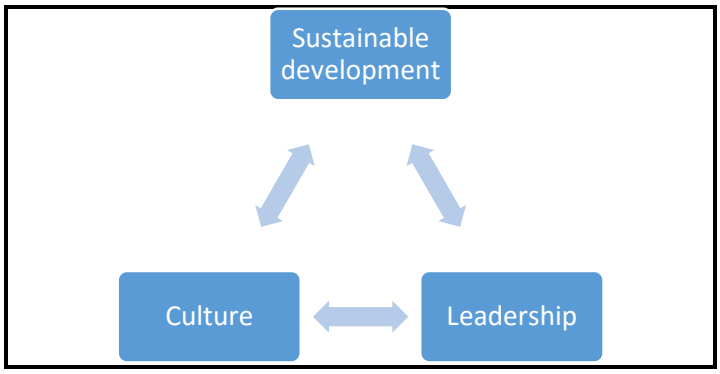


Figure 2.2 shows the relationship between sustainable development, culture, and leadership.

Leadership is inherent in an organization's evolution and trajectory (Gibson, 2005). The role that leaders take, the approach that they incorporate in leading, managing people, creating relationships and developing a sense of team collegiality is paramount to the culture of an organization (Davis, 2010, p. 89). When a leader enters an organization, that person creates culture through the creating of groups and sub-organizations (Gibson, 2005). Gibson (2005) asserts that a culture supports a leader in order to continue the evolution of that culture. The relationship between organizational culture and leadership is of great relevance in understanding organizations, mapping what happens and developing a shared understanding of its inner workings. In the case of Campus Kindergarten, a long history of programme critique and evolution, together with a strong base for community involvement, provided a foundation for building the sustainable planet project.

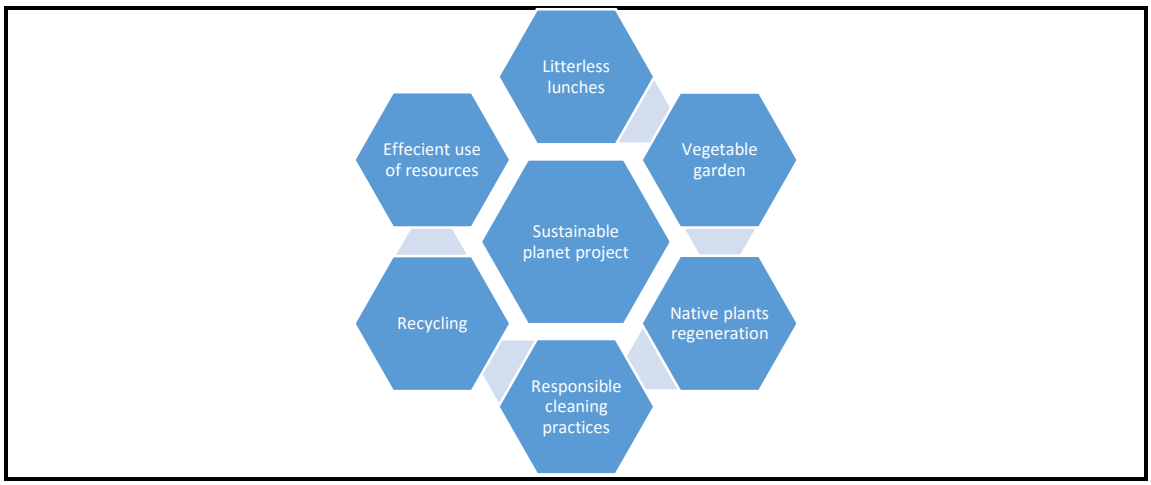


Figure 2.3 shows a mini project in sustainable planet project: Campus Kindergarten, 1997.

Campus Kindergarten is a vibrant learning community where families, staff and the University of Queensland work together to create a rich environment that supports the development of every child and nurtures their potential. The teachers at Campus Kindergarten have engaged the support of children, families and the broader community in making changes to many of their day-to-day practices. These changes have come about because a culture of sustainability has been created, built on an educational philosophy that values young children as active participants in a learning community, and where open and entrusting relationships permeate what the teachers do. Part of the process has been that the teaching staff have encouraged others to think about sustainable development, and supported their actions by engaging in a broad range of professional and community educational activities. Consequently, the transformations that have occurred at Campus Kindergarten also permeate the environmental attitudes, values and practices of others who work and care about the children's futures. People are the most valuable part of an organization, and their relationships are central to the growth and evolution of individuals and the organization. A culture that supports rights and respect has underpinned and enabled the development of the Sustainable Planet Project, so that sustainability is now lived and breathed within the organization. Once the idea of the Sustainable Planet Project was formulated, the teachers began working with the children on numerous small-scale, mini projects allied with their own environmental interests.

At times, there were periods of high energy. At times, individuals lost interest and momentum. There were periods when little was happening as other events, projects and priorities took precedence. Nevertheless, despite the ups and downs, all these mini-projects have become inculcated into everyday routines at the centre, and new projects are continually added. It could be said that the Center now has an "environmental ethic" where sustainability has become part of the center's culture and where environmentally friendly thinking and behavior permeate all aspects of the life of Campus Kindergarten. This ethic supports a view that even young children can be proactive participants in educational and environmental decision making as initiators, provocateurs, researchers, communicators, and activists. While all these mini-projects still continue, initially the Sustainable Planet Project had its operational challenges. A key barrier was the varying levels of knowledge and experience regarding environmental matters amongst the staff, leading to periods of great activity, and then times when interest and energy waned. There were times when other priorities and projects demanded time, energy and resources. There have also been frustrations with the level of parental commitment to some initiatives, especially the "litterless" lunch' policy which requires parents to pack the children's lunches

brought daily from home in ways that minimize pre-packaged food. Some parents have resisted the concept, seeking to explain why changing one's lunch-making habits was an unreasonable demand applicable to others, but not to themselves. These days, the teachers are prepared for such resistance and seek to work collaboratively with families rather than adopting a strict policy position.

Acting on some of the educational and practical possibilities that educators might consider as relevant to education for sustainability will help to make small steps towards making a more sustainable future for us all (Elliot, 2008). Such actions also provide opportunities for children to develop greater understandings of their roles and capabilities in helping to achieve this goal. For an EFS to reach its full potential, a shift in a way children are taught is pivotal. Children should not be regarded as passive recipients of knowledge, and for adults to make all the decisions about their learning. Children must be actively engaged in the learning process, and safe in an environment where they can share their ideas and contribute towards decision making (Davis, 2010). In such a learning environment, children have the potential to develop a sense of agency and make a difference. These are foundational steps in being knowledgeable, active and empowered citizens.

2.8 Ethics and pedagogy education for sustainability

Environmental ethics is based on the notion that all life has intrinsic value. In this regard, stewardship as a word has a culture in philosophy, especially in ethics, where it is mainly applied to represent responsible use of resources (Mutussis & Sheehan, 2003). In essence, sustainability is a value-oriented concept, like respect, responsibility and conservation are important attributes when equipping learners to conduct behavior that is considered morally acceptable. NEEP-GET (2005) states that one of the values embedded in environmental learning is creating a better world for all. Therefore, personal values are closely linked to social and environmental values. Semali (1999) argued that we must treat all members of humanity as ends rather than means, and this is extended in several environmental ethics to include ''rights'' for animals, plants, and ecosystems (Mutussis & Sheehan, 2003). Hence, this suggests that all living and non-living entities are dependent on each other for survival. According to Cambers (2008), education for sustainability must embody a commitment to values, principles,

attitudes and behaviour, and, more specifically, to a clearly understood notion of justice and equity.

Robinson and Vaealiki (2010) argue that regardless of the pedagogies that form the basis of an educator's early childhood education for sustainability (ECEFS) approach, there are two essential ideas that should be guided by ethical principles that are aligned with the transformative goals of ECEFS. Firstly, it is ensuring that early childhood educators, learners, and their families embark on learning journeys that generate solutions and actions. Secondly, the early childhood pedagogical approaches that hold the most promise for confronting the social and environmental issues in societies should encourage genuine and respectful partnerships and commitment to people and the natural world. In doing so, ethical principles are pivotal in teaching and learning about sustainable development. Hydon (2014) describes this as a way of travelling. Hydon (2014) further explains that when travelling, we use a compass to guide us on the path that we take. While a journey is a uniquely personal experience, it is often shared with others. Hence, ethical teachings may become collective understandings or cultural wisdom that gives direction and underpins both individual and group pedagogical practices. Sometimes these collective understandings are expressed more formally in a code of ethics. This is done by providing a broad framework, a code of ethics that is used to build awareness and understandings about the ethical practice among professional communities; that is, they provide educators with a set of governing principles upon which to base their ethical teaching decisions. A limitation of reliance on ethical codes is that the principles may have less relevance within a particular community context, may privilege one culture over another and may constrain the ethical choices that educators may wish to make.

One of the ways that early childhood educators can promote ecologically sustainable practices is to make ethical choices about resources and curriculum. Such choices are not without tension and dilemma. There is complexity in every choice as we weigh up the benefits and disadvantages to people and to the environment. A deeper understanding of the ethics inherent in our choices, though, can help to simplify the decisions that we make (Fien & Tilbury, 2002). While "pedagogy" continues to focus on the ways that educator teaches, recently the term has expanded in meaning to include "the learner" and the way he or she learns. Semali (1999) stated that they did not want to define pedagogy in a way which stresses only the teacher's role and activity. This is relevant as attention needs to be given to the learners as well. This reinterpretation is important because teaching has such a powerful effect on the learning

trajectories of children and their families. How and what the educator teaches has a direct impact on how and what a learner learns. Moss and Petrie (2002) remind educators that pedagogy is not neutral and value-free. One of the criticisms of current educational practice is that it predominantly uses pedagogies that do little to encourage critical thinking about ways to lead a sustainable life. For instance, play-based learning is a common pedagogy in early childhood education (ECE) that offers holistic opportunities for children to deepen their knowledge, to be creative and to engage socially. Therefore, many early childhood educators value the importance of children's creativity and curiosity, provide richly resourced environments, and offer open-ended learning experiences both indoors and outdoors. It is less common for early childhood educators to encourage young children to use their multiple knowledges and creative ideas to focus on sustainability issues. With these reaching across and into social, economic, environmental, political and cultural fields, the boundaries that have traditionally separated bodies of knowledge need to become permeable if we are to generate creative and innovative solutions in the places in which we live (Parliamentary Commission for the Environment, 2004).

2.9 Economic sustainability

Economic sustainability is the ability of an economy to support a defined level of economic production indefinitely. Hence, economic development has traditionally required growth in the gross domestic product. Technological change is another category of major change contributing to both the cause and the potential solutions of the major sustainability challenges facing society. Technological changes associated with industrialization, personal mobility (the automobile), food production, and many others, are directly linked to irreversible environmental changes. In considering a transition toward sustainability, as society faces a doubling of food production and rapidly growing energy demands, societal reliance on technical development is increasingly apparent. The rate of change in each of these categories has been accelerating throughout the past 100 years; the current pace of changes in environmental conditions, the interconnectedness of human society, and technological innovation are unprecedented. The value of integrating the advancement of the understanding of environmental, social, and technical change, integrating the study of human and natural systems, is increasingly being demonstrated and called for (Liu, Wan, Yan, & Wei, 2007).

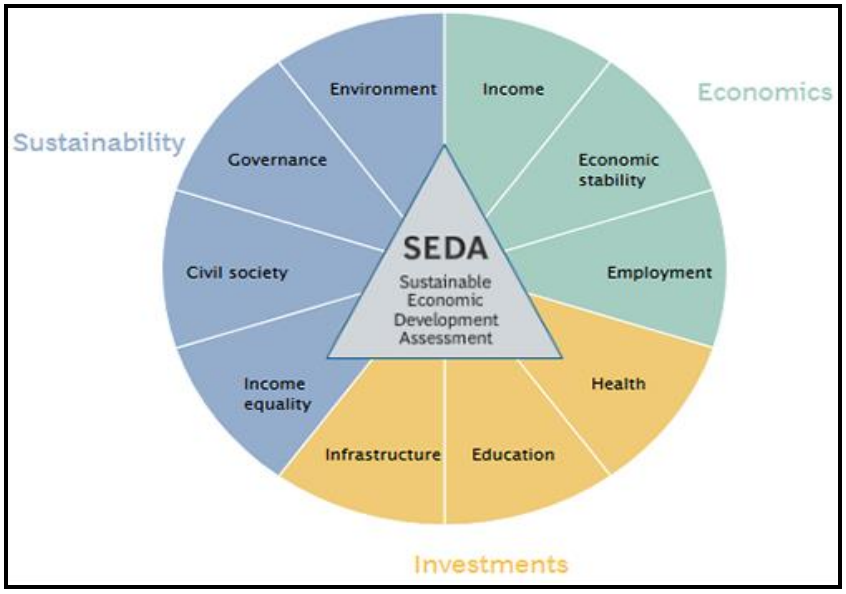


Figure 2.4 shows what constitutes economic sustainability: SEDA model

Green economists argue that the market needs modification to redress market failure, and regulation to achieve ecological sustainability. Pearce (1989) urge the internalization of hitherto externalized environmental costs and a recalculation of environmental benefits. Hawken, Lovins, and Lovins (1999) and Roodman (1996) argue for government action to change the balance of tax and subsidies to favour employment and environment rather than energy consumption, and to encourage business to change production technology. Daly and Cobb (1989) look to a combination of strong sustainability with market modification to include social and environmental costs. Korten (1996) believes that the global corporations and international agencies such as the World Bank and IMF need to be controlled so that capitalism can protect the environment and raise living standards for all. Reformers recognize that government has a key role in moving towards sustainable development as a business will need pushing, and in some cases controlling, taxes and subsidies need changing, as do targeting of research and disseminating of information. Most reformers also assume that there will be reform of the political system to increase democracy and participation. Girardet (1999), a leading figure in urban sustainability, puts the emphasis on the city level, arguing that a combination of best practice, enlightened civic leaders, active partnership with local business and public determination are the best way to success. The Real-World Coalition (Christie & Warburton, 2001), which represents 25 UK campaigning NGOs, links environmental and socio-economic concerns. It points out that the present business is a source of our greatest dangers owing to mounting inequality and poverty, environmental degradation and world instability.

2.10 Indigenous knowledge and sustainable development education

Indigenous knowledge is often perceived as historical and ancient practices of the African people. This perception is problematic because it assumes that indigenous knowledge is outdated and irrelevant currently which is not the case. Recognition of the importance of indigenous knowledge systems (IKS) is evolving and is believed to mitigate environmental degradation in support of sustainable development. The term "indigenous" has often been used to refer to specific groups of people defined by ancestral territories, collective cultural configuration, and historical locations (Purcell, 1998; Dei, 2002; Turay, 2002; Angioni, 2003). In this context, indigenous knowledge is a multifaceted body of knowledge, practices, and representations that are maintained and developed by peoples with long histories of close interaction with the local natural environment (Owuor, 2007). The term indigenous, therefore, denotes that the knowledge is typical and belongs to peoples from specific places with common cultural and social ties. Thus, indigenous knowledge is a process of learning and sharing social life, histories, identities, and economic and political practices unique to each cultural group (Owuor, 2007). This reflects the uniqueness of ways that specific societies make meaning of the world, and how such forms of knowledge address local problems and solutions that are context-specific. This implies that all countries are unique, and what works for one country may not work for another country. Hence, indigenous knowledge is making them rich in problem-solving initiatives regarding nature.

IKS's were also developed by the experiences or experimentation of our forefathers (Owuor, 2007). The obstacle that devalues indigenous knowledge is the fact that it is not documented because, in the olden days, people did not have the skills and knowledge to document such data. Hence, the knowledge systems were legitimized and fortified under suitable institutional frameworks, culture, and practices. They have been passed on to other generations and have enabled indigenous people to survive, manage their natural resources and the ecosystems surrounding them like animals, plants, rivers, seas, natural environment, and economic, cultural and political organization (Owuor, 2007). This is done by using the knowledge that they have inherited from their forefathers. They did not have the technology and education that we have. They lived to survive and that was through interacting with the natural environment and understanding the natural processes.

In this study, indigenous knowledge is framed as the complex set of activities, values, beliefs, and practices that have evolved cumulatively over time, and is active among communities and

groups who are its practitioners (Owuor, 2007). It remains so if the groups and communities who are its practitioners are committed to sustaining, creatively developing, and extending its potential enrichment within a specific setting. Since most of the inhabitants of Kenya, for example, live in rural areas, thus depending directly on natural resources for their livelihood, it can be inferred that indigenous knowledge systems, which relate to such resources, are still very much in use and remain important to these communities. It is also important to note that such practices have evolved over time and regions, as a response of individuals' and communities' need to adapt to challenges posed by their social and natural environments. As stated by Dei, Hall, and Rosenberg (2002), knowledge cannot be perceived as fixed categories, experiences, and social practices. Wane (2002) has argued that in the process of learning the old knowledge, new knowledge is discovered, and this is what makes indigenous knowledge more dynamic. Therefore, when analysing African indigenous knowledge forms in, say, Kenya, there is a need to realize the complexities of its evolution due to its transition, enrichment, and devaluation during the colonial era. On the other hand, more people are becoming westernized, thus neglecting cultural and indigenous practices that helped to sustain their communities.

Indigenous knowledge is developed and sustained through traditional education, which provides skills, trade training, and socialization avenues for many youths in Kenya today who never attended, or dropped out of, the formal school system (Owuor, 2007). The elderly is the living proof of the experiences that they have had, but nowadays, we read, acquire knowledge and believe the knowledge that we do have proof of. Modernization in Africa has led people to neglect their cultures and forget their identities. Common features in the process of knowledge transmission among most ethnic communities in Kenya occur within the context of family, community, clan tribe, and cultural age groups. It is a lifelong learning process involving progression through age groupings, seniority, and wisdom of elders (Wangoola, 2002). Among certain ethnic groups, for example, the Luo's of Western Kenya, knowledge and wisdom is perceived to advance with the age of individuals based on their experiences with life. The purpose of indigenous education is to place knowledge within the context of the user (Dei et al., 2002; Wane, 2002). In the precolonial era, most Kenyan ethnic communities, as in other parts of Africa were guided by worldviews and value systems where spirituality became the guiding force for all human activities and development (Dei et al., 2002; Wangoola, 2002). This is reflected in the communities' proverbs that are a source of indigenous knowledge from which we can learn or reaffirm certain valuable realities such as peace, harmony, love for life,

and respect for individuals, property and the environment. In this case, environmental preservation was key in human activities, since the presence of God was manifest in the typology. According to Owuor (2007), indigenous education practices among Kenyan ethnic communities are holistic as they integrate all activities, including rituals and skills required to sustain cultural practices, the life of the family, and the community. The aim is to prepare individuals for communal responsibility and interpersonal relationships as key components of the learning process. Therefore, combining specific skills acquisition with good character has been considered as the virtue of being well educated and a well-integrated member of the society (Mungazi, 1996; Semali, 1999). As stated by Mungazi, an individual's "place in society was determined more by his contribution to its well-being. The individual had to be trained to remain sensitive to the needs of the community and others as individuals" (p. 40). Cultivation of individuals' responsibilities to their communities becomes a dominant objective of the teaching and learning process in indigenous education. Ntuli is correct when claiming that indigenous knowledge systems are a counter-hegemonic discourse in the context of the African Renaissance (Ntuli, 2002).

Although sustainable development is usually linked to environmental issues, the importance of education in sustainable development is also vital. The question is, however, what kind of education for sustainable development? When Chilisa (2003) state that it is through education that "we learn about our cultural heritage and our values, and it is the means by which we transmit all forms of knowledge through generations" (Chilisa et al., 2003, p. 4), they have an education process in mind which is deeply rooted in the epistemological reality of the local people. It is in this context that the African Renaissance is important as it seeks, according to Odora Hoppers, to build "a deeper understanding of Africa, its languages and its methods of development" (Ntuli, 2002, p. 2). On the other hand, the dependency relationship between developed and underdeveloped countries, typically assumes that the underdeveloped countries will follow the developed countries traits in order to come to their standards in terms of development. This is also affirmed by the conditions that the World Bank (WB) places for developed countries to make loans to underdeveloped countries to invest in development. This means that developed countries have control over underdeveloped countries.

Owuor (2007) asserts that the terms "development" and "sustainable development" need therefore also to be addressed from an indigenous perspective, thereby including other epistemological and cultural perspectives of what sustainable development implies. The

assumption is that perspectives from different knowledge systems produce a more comprehensive understanding of sustainable development interventions. The implication of such an assumption is not, however, that indigenous knowledge systems are completely isolated from Western knowledge; people will incorporate and reinterpret aspects of Western knowledge and practice into their traditions as part of the ongoing process of globalization (Sillitoe, 1998, p. 230). Moreover, any inclusion of indigenous knowledge does not imply its overall relevance and adequacy in addressing developmental issues. While indigenous knowledge often has important advice, knowledge, and information to offer, there are also examples from Africa where indigenous knowledge has been a barrier to sustainable interventions.

Ntuli (2002) is right in claiming that the influence of indigenous knowledge systems in education is marginal. When indigenous culture is introduced in school it is often in terms of what Gyekye calls "a truncated and hence impoverished conception" (Gyekye, 1997, p. 107) such as local cultural expressions like dancing and singing. Important as these events may be, they do not really address the underlying epistemological foundation of the indigenous culture and its relation to sustainable development, and they become isolated from the general thrust of the curriculum (Owuor,2007). Dei (2002) asserts that we need to call for locally defined models of sustainability in which will prevail the realities of local peoples, with all their societal, cultural, political, spiritual, moral, and ecological goals and aspiration (p. 12). An endogenous approach to education is multifaceted, and designates, among other factors, environmental preservation practices as key to sustainable development (Owuor, 2007). Thus, communities are able to build their social and cultural capital in order to exercise their sovereignty in their own development processes. The idea is to set up appropriate institutional spaces for communities and educators to provide guidance to socio-economic development through multiple forms of knowledge, including indigenous knowledge forms and pedagogies (Owuor, 2007). Through this approach, it is hoped that communities will be able to self-organize and self-direct skills and knowledge that can support development at the micro level (Dei, 2002; Mwenda, 2003; Shiva, 2003; UNESCO, 2005) in order to avert the current economic marginalization facing African countries such as Kenya.

2.11 Teachers knowledge of Teaching strategies use to teach sustainable development

According to Esa & Adawiah (2012), the school curriculum is focused on fostering environmental literacy, attitudes and values that go beyond a mere understanding of environmental problems but require action to take place. Such knowledge is required from teachers who are involved in the design and implementation of sustainable development programs in schools (Esa & Adawiah, 2012). This view is problematic since in reality, teachers are not included in designing and decision making of these policies whereas they are the ones who are expected to implement these policies. In Malaysia, education is focused more on Environmental Education compared to Education for Sustainable Development. Therefore, to understand Education for Sustainable Development, teachers should be knowledgeable about the environment because environment is part of the three components included in the EESD concept (Fuertes-Camacho, Graell-Martin, Fuentes-loss, Balaguer-Fabregas, 2019). In addition, teachers can instil values to learners to make them agents of change. This is also supported by those who reported that due to their limited environmental knowledge geography teachers find it difficult to integrate environmental knowledge in their teaching. Such actions will foster changes in behaviour in teachers, learners and pass on to the communities which can promote the formation of a sustainable society (Esa & Adawiah, 2012). Teachers need to be empowered and be given the necessary initial training and must be equipped with efficient and effective methodological strategies. It is unquestionable that today's professionals must be able to understand how their professional activity interacts with society and the environment, both locally and globally, in order to identify possible challenges, risks, and impacts (Fuertes-Camacho et al, 2019). It is crucial to transfer sustainability competencies to the teaching profession by developing competencies in education for sustainability, linking the teaching of sustainability to student learning (Fuertes-Camacho et al, 2019).

2.12 The use of mapping to teach sustainable development

Geographic information covers a wide range data, including the distribution of natural resources, description of infrastructure, pattern of land use, employment, housing, health and voting habits of the people (ESRI, 2008). ESRI (2008) opine that GIS is a special type of ICT that integrates hardware, software, and data for capturing, managing, analysing, and displaying all forms of geographically referenced information for comprehending geography and making intelligent decisions. GIS maps are interactive. On the computer screen, map users can scan a GIS map in any direction, zoom in or out, and change the nature of the information contained

in the map (ESRI, 2008). The maps are important when teaching about sustainable development. Currently in public schools, an Atlas is used to see different places. On the other hand, some schools are more privileged and have computers where they use the GIS software such as arc map where they cancan choose whether to see the roads, how many roads to see, and how roads should be depicted (Duarte, Fonseca, Portela, Queirós and Paiva, 2018). Then they can select what other items they wish to view alongside these roads such as storm drains, gas lines, rare plants, or hospitals. Some GIS programs are designed to perform sophisticated calculations for tracking storms or predicting erosion patterns. The growing human population and its demands on the earth's resources generate a need for sustainable practices. Implementing these practices often requires collaboration between different organizations (Duarte et al., 2018). GIS software allows users across the globe to share ideas on how to meet their resource needs, plan efficient land use, and protect the environment to guarantee the survival of future generations. Therefore, teachers can use GIS to teach learners about how they can use the data on the system to plan ahead and mitigate challenges that are caused by environmental depletion.

2.13 Use of local agencies such as WESSA to teach sustainable development

WESSA (the Wildlife and Environment Society of South Africa) is a South African environmental organisation which aims to initiate and support high impact environmental and conservation projects to promote participation in caring for the Earth (Denison, 2018). WESSA is an internationally recognized organisation which also aims to implement environmental initiatives working closely with schools and teachers throughout South Africa on a range of local and international programmes to support and improve school curricula with regard to environmental learning, enabling learners to achieve their full potential towards a sustainable future by taking environmental action in their own areas (Denison, 201). As a geography teacher, getting in touch with the local environmental organizations may help to broaden understanding of sustainable development. Furthermore, learners will be encouraged to act in a sustainable manner if they see that there are such organizations which are dedicated to caring for the environment. The Eco-Schools programme is an international that was developed to support environmental learning in the classroom. WESSA provides a good foundation in schools in teaching, sharing and communicating with teachers as it is a community outreach to save the earth. WESSA further provides strategies that help and motivates teachers to initiates environmental initiatives for a sustainable future (Denison, 2018).

2.14 Challenges of sustainable development

Sustainability initiatives in educational curricula and contexts have been a focal point of attention in recent years (Mwenda, 2003). These initiatives manifest typically as educators or the society responds to increased awareness about the fragility of natural environments in the local and global context (Miller, 2005). However, the environmental dimension of sustainability sits alongside social, political and economic areas of concern. Collectively, these four dimensions generate a holistic understanding of sustainability, described by UNESCO (2005) as four interdependent dimensions that require simultaneous and balanced progress. In Australia, social, political and economic issues, including reconciliation, fairness, and inclusion have been discussed as part of the broad sustainability agenda (Dei, 2002; Mwenda, 2003; Shiva, 2003; UNESCO, 2005). However, the discussion has focused mainly on environmental concerns. There is a political element to environmental or greening initiatives because they involve adults and children as activists and advocates for environmental change. Davis (2010) highlights that ECEFS is promoted as a time for providing children with a significant foundation for adult activism. However, literature and practice show little evidence of explicit links between sustainability and broader social, political and economic issues.

In the educational context, greening practices may include gardening projects, landscaping, water, and energy conservation practices, the use of environmentally friendly products, rubbish reduction and recycling (Miller, 2008). Sustainable development principles translate to collaborative and democratic teaching and learning approaches and values learning, but most prominently recognition of children's capacities to create positive change. According to Davis (2008), the term "change agents" refers to children's capacity to create positive change through environmental initiatives, and to influence others in their social circles to generate changes in attitude and practices. In this respect, children have become agentic in enacting a moral and ethical response to environmental challenges facing their generation, but may not often be provided with opportunities to explore broader social, political and economic issues that are related to environmental concerns.

The actions of institutions and educators who green their curriculum are seen to be a moral response to issues of sustainability that have an impact on current and future generations of young children (Davis, 2008). Davis suggests that greening as a practice has received much attention because it is given a moral or ethical purpose for serving the interest of young children

in the long term. To broaden the scope and purpose of sustainable development, educators will need to understand how Western orientations of sustainability are linked historically to development focused on economic, social and political gain. In Australia, the Western (industrial) paradigm of development can be linked with the act of dispossession of indigenous peoples from their land; an act premised on hostile occupation and subsequent development and gain for an invading European population. (Behrendt, 2003).

We might, therefore, consider whether sustainability should be imagined as planning's "saving grace" or "road to perdition" (Mwenda, 2003). Social and ecological indicators suggest it has failed to deliver on its promise of being a "saving grace," and remains a complex construct struggled over in the classroom and on the ground. Geographers have long privileged students getting out of the classroom and into the "real world" to study complex problems (Fuller, Edmondson, France, Higgitt, & Ratinen, 2007; Sauer, 1956). The field is celebrated as a place for experiential, active learning that connects theory to practice, increases the enjoyment of, interest in, and effective connection to the subject, and provides the opportunity to develop specific skills (Hope, 2009). Field study can encourage transformative and social learning as students transform how they see and act in the world through their social networks and the social contexts they interact with (Reed, 2010). Still, scholars caution against the uncritical acceptance of the benefits of field study. Feminist geographers draw attention to oft-unasked questions about expertise, positionality, power, and the consequences for local communities (Rose, 1992). Shurmer-Smith (2002, p. 165) rejects a "shepherding" approach to field excursions, were "thirty young people (with clipboards) strain to catch the lecture given on the corner of a street with few things more pointless than the mapping exercises that follow." Nairn (2005) pointedly questions the elevation of "the field" to the status of some mythical place offering unmediated access to the "real world". Reflecting on a field programme in New Zealand, she challenges claims that "first-person research" (in this case talking with migrants rather than just reading about them) protects students from the inductive influences of their preconceptions and allows direct insights into the experience of migration and race. In her case, students' preconceived stereotypes about alcohol and spousal abuse were merely "confirmed" by field observation. For Nairn, ideology insidiously shapes perception even for students engaged in "direct" field observation, which, in turn, can reinforce misconceptions and dangerously reproduce the social setting a programme intends to discredit. With these concerns in mind, we highlight our efforts to deliver and assess the learning associated with the Cascadia Sustainability Field School offered through the University of Victoria, Canada. On this month-

long travel-study programme, students trace how sustainability has come to be variably understood, struggled over and practised on the ground in the trans-boundary, Pacific-coastal region some refer to as Cascadia (see Figure 1). Students engage with one another, local activists, planners, scholars, and others who are all grappling with sustainability in areas such as green building, active transportation, food security, and relocalization. Mezirow (2000) describes transformative learning as occurring when we transform our taken-for-granted frames of reference to make them more inclusive, discriminating, open, changeable and reflective so that they may generate beliefs and opinions that will prove truer or justified to guide action. A critical pragmatic approach further emphasizes the interrogation of normalized structures and discourses in capitalist modernity that insidiously reproduce uneven social relations.

Sustainability education often privileges one of the two: robust critical reflection or a pragmatic, action orientation. Maniates (2013, p. 258) argues that too many sustainability focused programmes privilege applied problem-solving over critical reflection. In so doing, such programmes neglect careful consideration of how action fits into "a larger mosaic of political power, cultural transformation, and social change" (Maniates 2013, p. 258). Without nuanced critical reflection, practical action can unintentionally reproduce insidious infrastructures of power. Conversely, programmes may focus exclusively on critical theory while foreclosing outlets for hopeful, practical and creative action (Latour, 2004). If the hatchet of deconstruction is wielded without the seed of practical action, students are left as disempowered, indignant spectators.

Changing learning and teaching policies are 'maintainable' if there is the right "support" or, as we assert, a strategic approach applied with flexibility in mind. Sustainability, therefore, includes aspects of transformation, adaptation, flexible capacity, and manageability. It also involves an active strategy. In Mwenda's (2003) analysis of social modes of behaviour in everyday life, he claims strategy involves a calculated assessment of existing power relations, becoming possible when subjects locate themselves, their initiatives and their actions. It is a necessity for educators to constantly 'negotiate their way in an environment that is constantly changing, often in ways that have been largely unforeseen' (Lawler & Sillitoe, 2010). Hence, the capacity to be strategic is not only imperative for change management (Lawler & Sillitoe, 2010), but also for the implementation of new institutional initiatives to secure government funding.

Higher education is primarily a place of concentrated learning, and in that context the university could be, through its teaching and curriculum, promoting and advancing sustainability (Lawler & Sillitoe, 2010). A curriculum designed to promote sustainability does not only require a traditional knowledge base, but instead requires a new and emerging set of skills, perhaps, most importantly, skills requiring synthesis, integration, and appreciation of complex systems. Higher education, therefore, has the potential to facilitate a societal transition by adjusting its curriculum to incorporate, reward and support skills of synthesis, integration, and complex systems thinking. For example, while engineers have been traditionally taught how to build a bridge, society now needs engineers that not only know how to build a bridge, but can also incorporate into the building of the bridge considerations about what is on both sides of the bridge, who might be using the bridge, when and why, and how the need for the bridge may change over time. Strategic planning and understanding of the social infrastructure surrounding technological development are, in this new era, a critical part of engineering education. A broader societal context for understanding and interpreting the societal impact or significance of any technology, discovery, or disciplinary focus is now critical. This need for contextualization encompasses a new need for systems thinking and management of complexity and interconnections and de-emphasizes the need for technological perfection or disciplinary narrowness.

2.15 Theoretical framework

Any research study should be framed within a particular theoretical framework so that it relates to the philosophical basis on which the research takes place, and forms a link between the theoretical aspects and practical component of that particular study (Sinclair, 2007). This study is underpinned by the sustainable development theory developed by Bruntland's Commission (1987). This theory is concerned with maintaining economic advancement and progress while protecting the long-term value of the environment. It is based on the importance of intergenerational equity as the overall goal of sustainable development. Deisendorf (2007) maintains that sustainable development is achievable through the integration and acknowledgement of the economic, environmental, cultural and social concerns throughout the decision-making process.

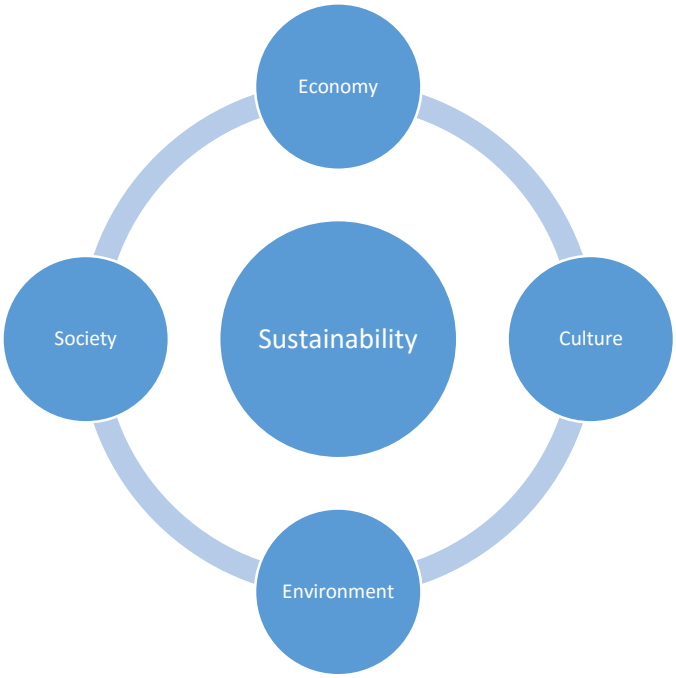


Figure 2.1: Shows that sustainable development is achieved through the interdependent relationship between the economic, social, cultural and environmental aspects.

Sustainable development as a theory is informed by the principles of ethics as part of achieving equity between the present and future generations. However, the report makes it clear that the "needs" of the future generation are conserved and respected so that it will be able to achieve its own. In essence, my study explores the teaching strategies that are used to teach sustainability, as learners in schools are taught skills on how to conserve the environment through geography and environmental awareness campaigns.

Sustainable development is heavily grounded by four pillars, namely: the economic, social, cultural and environmental sectors. Economic development is important for a country to function. People seek employment and money to eke a living, and this has an impact on the natural environment, as land has to be available for that to take place. In addition, the society has an impact on sustainable development, as owing to the ever-increasing population, people have needs such as housing and other development, which require the environment to be compromised. Furthermore, culture has an impact on the environment as people feel the need to use the natural environment to fulfil their cultural needs. Lastly, the environment is affected by natural unforeseen disasters such as floods, which cause not only damage to the environment, but also to the infrastructure, which damages the economy. Overall, these four

pillars of sustainability are based on a moral outlook on the dependency relationship between humans and the natural environment. The next section unpacks the theoretical framework underpinning this study.

2.16 Conclusion

To sum up, the driving force in this chapter was the available studies on the different teaching strategies that teachers use to teach sustainable development. In this chapter, at first, the concept of sustainable development was defined. Thereafter, the different teaching strategies were outlined and how they are used to teach sustainable development. This was followed by examining how sustainable development should be taught, and this was done by reviewing the curriculum document. From there, I moved on to review the literature regarding the place of ethics and indigenous knowledge in teaching sustainable development.

CHAPTER THREE

THE EXPLICATION OF THE RESEARCH METHODOLOGIES

3.1 Introduction

All research is based on some underlying philosophical assumptions about what constitutes "valid" research and which research method(s) is/are appropriate for the development of knowledge in a given study. In order to conduct and evaluate any research, it is therefore important to know what these assumptions are. This chapter outlines the description of the research process adopted in this study. van Wyk (2006) contends that a research methodology is necessary to focus on the research process and acquiring new knowledge. This section is important to critically reflect on how the research was collected, and unpack the relevance of the chosen research style for this research. It first outlines the paradigm that underpins this research and the consequent choice of a qualitative approach. In addition, the chapter discusses the research methodologies, and design used in the study, including strategies, instruments, and data collection and analysis methods, while explaining the stages and processes involved in the study

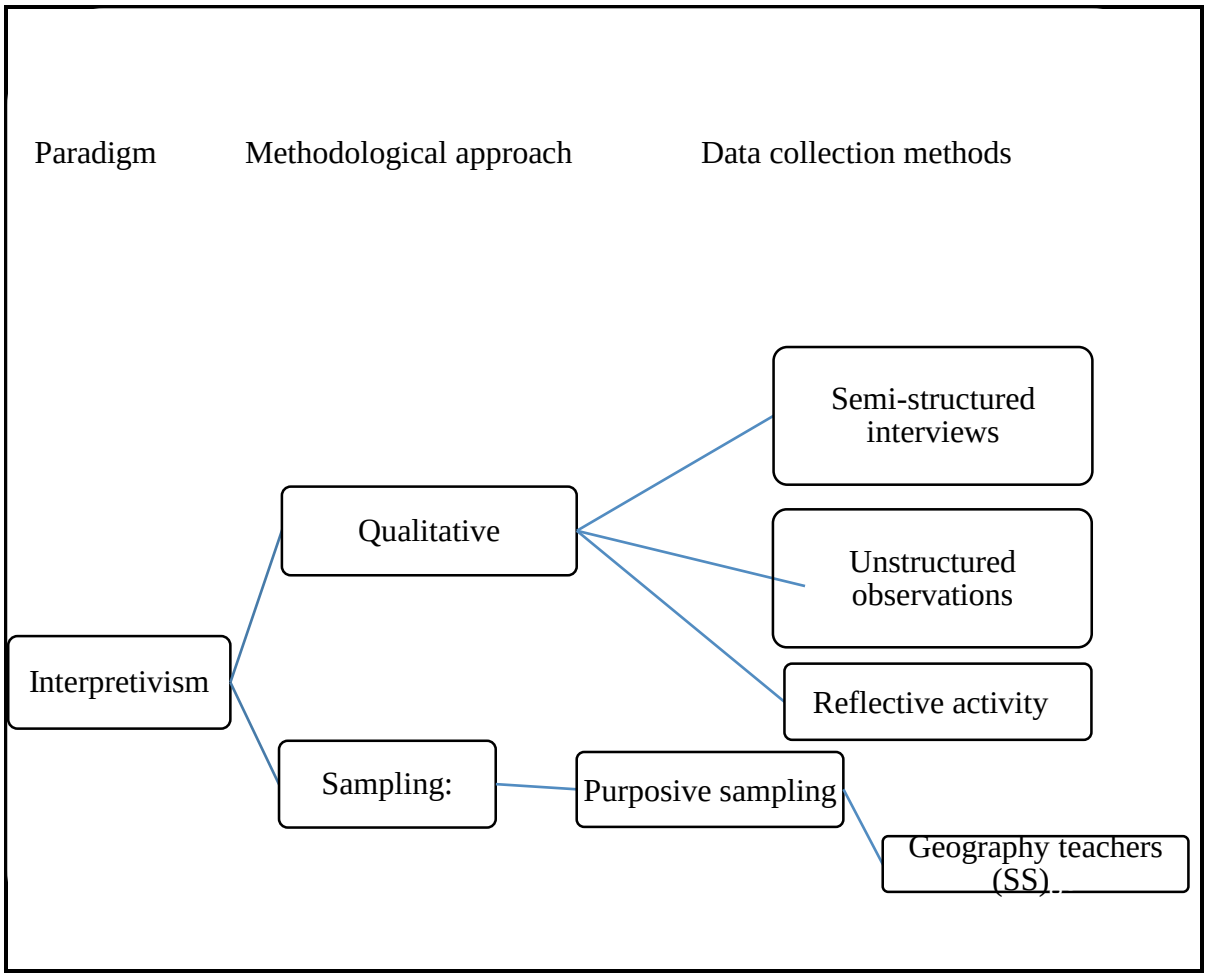
3.2 Research paradigm

In research, a "paradigm" is essential to guide the researcher as to how the study will be conducted. A research paradigm represents a system of ideas or views which are used by a community of researchers to generate data and knowledge (Fossey, Harvey, McDermott, & Davidson, 2002; Bertram & Christiansen, 2016). This study is aligned with the interpretivist paradigm. This paradigm holds the belief that there is not a single reality or truth about the social world, but rather a set of realities or truths which are historical, local, specific and non-generalizable (Bertram & Christiansen, 2016, p. 26). Thus, this study intends to make meaning out of human experiences, perspectives, and feelings. While Bertram and Christiansen (2016) state that researchers in the interpretivist paradigm do not aim to predict what people will do, but rather to describe and understand how people make meaning out of their social world and how they consider their own conduct. Therefore, this paradigm is relevant to this study because there is a need to understand the teaching strategies that geography teachers use to teach sustainability (Fossey et al., 2002). Hence, learning about the different teaching strategies that geography teachers use to teach the concept of sustainable development is essential to

understand the type and relevance of skills that teachers equip learners with to practice sustainable development in the communities at large. Linked to this position is the argument that the facets of the real world that are distinctly human are lost when they are analysed and reduced to the interaction of variables (Hughes & Sharrock, 1997, p. 102). For this reason, the role of the researcher should be to analyse the various interpretations that actors related to a phenomenon give to their experiences (Easterby-Smith, Thorpe, & Lowe, 2002).

Thus this study falls under the interpretivist paradigm, as it intends to make meaning out of human experiences, perspectives, and feelings. While Bertram and Christiansen (2016) state that, researchers in the interpretivist paradigm do not aim to predict what people will do, but rather to describe and understand how people make meaning out of their social world and how they consider their own conduct. This suggests that interpretive researchers believe that the reality consists of people's subjective experiences of the external world, and thus they may adopt an intersubjective epistemological belief that reality is socially constructed (Mackey & Gass, 2015). This means that researchers in this paradigm strive to derive their constructs from the field of study through in-depth scrutiny of the phenomenon of interest in order to arrive at data which will be meaningful and valued. It is maintained that all humans are attempting to make sense of their world, and by so doing they continuously interpret, create, provide meaning, define and justify daily actions (Du Preez & Roux, 2008).

Research process diagram



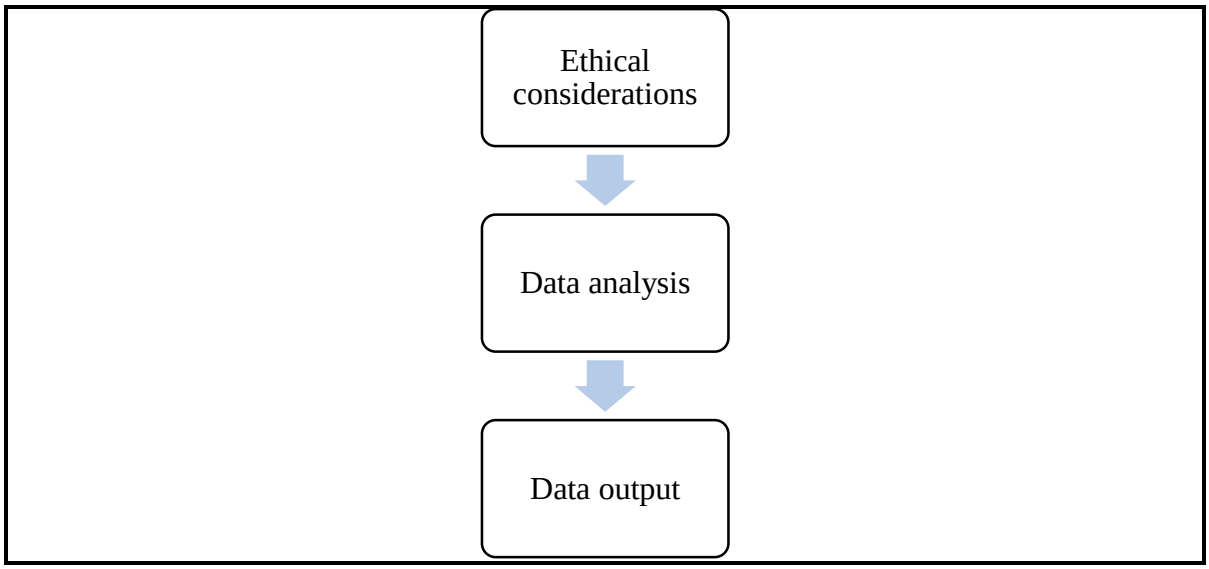


Figure 3.1: The research process of this study

3.3 Methodological approach: Qualitative

Schumacher and McMillan (2006: 22) refer to the research design as the plan for generating empirical evidence that will be used to answer the research questions. Creswell (2014) defines the qualitative research approach as meant for exploring and understanding the experiences of individuals or groups of people which are ascribed to social problems. According to Domegan & Fleming (2007), qualitative research aims to explore and discover issues about the problem at hand, because very little is known about the problem. There is usually uncertainty about a problem's dimensions and characteristics. It uses "soft" data and gets "rich" data (Domegan & Fleming, 2007, p. 24). According to Creswell (2014), qualitative research is designed to help researchers understand people and the social and cultural contexts within which they live. In many ways, the interpretivist position adopted in this study is based on a belief that a qualitative approach to the research will best provide insight, given that the purpose of the study is to explore the teaching strategies that teachers use to teach sustainable development. Hence the qualitative approach will provide the researcher with an understanding of the teaching methods that geography teachers use to teach sustainability, considering the location of their schools and the schools' particular ethos. Litchman (2006) affirms that in qualitative inquiry, the aim is to understand the lived experiences of human interactions when people are communicating with each other. This study aims to investigate a particular way of looking at and deriving meaning from the phenomenon under investigation. Denscombe (2014) affirms the strength of qualitative methodology when he says that it allows researchers an opportunity to better understand human social circumstances.

Krauss (2005) states that the qualitative approach attempts to find an in-depth understanding by asking questions in an interview format which results in information that allows teachers' experiences to be interpreted, and what influences their experiences to be known. This study aimed at understanding the teaching strategies that geography teachers use to teach sustainable development in Pinetown district. Enough time was spent analysing the data to ensure that the findings accurately reflect the way in which the participants construct meaning.

3.4 Sampling process: Purposive sampling

According to Bertram and Christiansen (2016), sampling involves making decisions about people, settings, events or behaviours to include in the study. Therefore, it is important to decide how many individuals, groups or objects (such as schools) will be observed. In this

study, the researcher used purposive sampling as it best suited the research design, and it allowed the researcher to collect data effectively. In this study, the researcher purposively chose three geography teachers from different schools within the Pinetown district. These educators were known to the researcher and would allow flexibility in terms of availability to conduct interviews and observations. The chosen sample would be requested over the phone to confirm participation and availability.

Participants	**Gender**	**Location of school**	**No. of Years teaching**	**Grade teaching**
Participant 1	Female	Urban area	9	Grade 6
Participant 2	Female	Urban area	6	Grade 5
Participant 3	Female	Urban area	20	Grade 7

Table 3.2 shows the description of the participants that participated in the research.

3.5 Data generation methods

Data generation refers to the theory and methods used by researchers to create data from sampled data sources in a qualitative study, data sources that include human participants (Suresh & Rath, 2014). Within the tradition of qualitative research, there are three broad categories of data collection: participant observation, interviewing and observations (Mouton & Marais, 1996). For this study, the following three data generation methods were adopted to generate data, namely: reflective activity, semi-structured interviews, and unstructured observations. A semi-structured interview approach was adopted to better understand the teaching strategies that geography teachers use to teach sustainable development from the perspective of the participant. During the interviews, participants were asked to share their experiences and the various teaching methods that they use to teach sustainability in their respective schools. On the other hand, unstructured observations were adopted to understand the school context at large, taking into account various aspects that may have an impact on the implementation of the different teaching strategies.

3.5.1 Semi-structured interviews

An interview is a conversation between the researcher and the respondent (Bertram & Christiansen, 2016, p. 80). A semi-structured interview is a qualitative method of inquiry that

combines a predetermined set of open questions (questions that prompt discussion) with the opportunity for the interviewer to explore themes or responses further. In this study, semi-structured interviews were conducted to find out what the participants knew, what they thought, and the different strategies that they used to teach sustainability. Gingging (2013) argues that a one-to-one semi-structured interview is a method used to generate data based on direct interaction and exchange of words between the interviewer (e.g. the researcher) and interviewee as a participant. This type of interviewing is easy to conduct and can be easily standardized, as the same questions are asked of all participants. To be consistent with all participants, the interviewer had a set of pre-planned core questions for guidance such that the same areas were covered with each interviewee (Gingging, 2013).

In this research, three geography teachers were elected to be interviewed. This sample was representative in terms of the school sector, the geographic location and the different number of years they had taught. The shortcoming in the sample was that only female teachers were interviewed to ensure their availability and the convenience for the researcher.

Meetings were held in September 2018 with the educators to explain the nature and scope of the research to gain their acceptance of their participation. The educators who agreed to be interviewed were invited via phone calls and meetings to arrange convenient times for their interviews. Semi-structured interviews with the three educators were conducted in October and November 2018. The interviews took place after school in their respective classrooms. They were recorded with a cell phone recorder, and transcripts were used during data analysis. Each formal interview lasted for about half an hour and included prompts to help them to talk freely about their chosen teaching strategies for teaching geography. According to Creswell (2014), researchers must grant interviewees the freedom to speak, so that information obtained becomes relevant. The interview schedule enabled the data collection of information regarding the main research questions of the study. The conversations went smoothly and pleasantly.

3.5.2 Unstructured observation

In research, observation means that the researcher goes to the site of the study (the school) and observes what is taking place there (Bertram & Christiansen, 2016, p. 84). An unstructured observation means that researchers do not go through a checklist, ticking off boxes or rating activities they see occurring, but write a free description of what they observe (Bertram &

Christiansen, 2016, p. 89). In this study, the researcher observed the teaching strategies that teachers use to teach sustainability, and how geography teachers integrate the concept in the school environment at large. This was done by taking comprehensive notes and photographs, which documented pertinent elements of the school context. The observation method used here is considered vital to the study as it added significant depth to the case analysis. As noted by Bryman and Bell (2007), observational methods have the advantage of directly evaluating learners' involvement and engagement in the learning environment and with the learning activities. This type of information about built spaces like schools can convey meanings in relation to the values and beliefs of those who use that space (Yanow, 1998). Since sustainable development is a practical concept, observation of schools is pivotal to understand the impact of the teaching strategies that are used to teach sustainable development. The researcher observed the school context, and one lesson with each participant, which lasted for an hour per session. The photographs supported these notes, recorded the visits to schools, and provided a significant source of visual data. As Yin (2003) has commented, at a minimum, photographs are useful to convey significant details about the case to outside observers. Selected photographs are included as Appendix B.

3.5.3 Reflective activity

Reflective activity refers to the purpose of identifying the strengths and weaknesses of the participants' point of view, based on the phenomenon being studied (Boden & Edmonds, 2009). Reflective practices are methods and techniques that help individuals and groups reflect on their experiences and actions in order to engage in a process of continuous learning (Groessler, 2017). Dewey (2007) states that reflective activity should be considered necessary for human development. Teachers need to think and mull over what they have experienced informally, formally and non-formally. After doing so they should apply that collective experiential knowledge better to demonstrate improved teaching practices in the classroom. In the context of this study, the researcher gave participants a short test paper which consisted of questions which would show their level of understanding teaching strategies in teaching sustainable development, as she intended to transform their mentality towards teaching it. The reflection-observation phase allowed the researcher to recapture the entire data collection setting, events, and processes. Understanding what transpired between the researcher and the participants is essential to obtain a full and accurate account of the situation (Leininger, 1985). The period of reflection was followed by confirmation of the findings with informants to ensure

that the researcher had captured the data accurately and truthfully. The role of educators in achieving quality and relevant teaching and learning of sustainable development is of great significance in the present dispensation.

3.6 Ethical considerations

Approval for the study was sought and granted from the University of KwaZulu-Natal Ethics Committee (see ethical clearance certificate in Appendix A), and from the Department of Basic Education through the Regional Chief Director, who granted the researcher permission to go ahead with the study. The researcher went to the schools to ask and make arrangements for administering interviews and observations. Participants were made aware that participation was voluntary, and they could decide to withdraw at any point. Creswell (2014) states that the researcher has an obligation to respect the rights, needs, values, and desires of the informants. The researcher ensured that the confidentiality and anonymity of the participants would be maintained through the removal of any identifying characteristics before widespread dissemination of information. She made it clear that the participants' names would not be used for any other purposes, nor would information be shared that revealed their identity in any way. The participants were informed of the purpose of the study, the methods of data collection and analysis to be used, and the manner of publishing the outcomes.

3.7 Trustworthiness

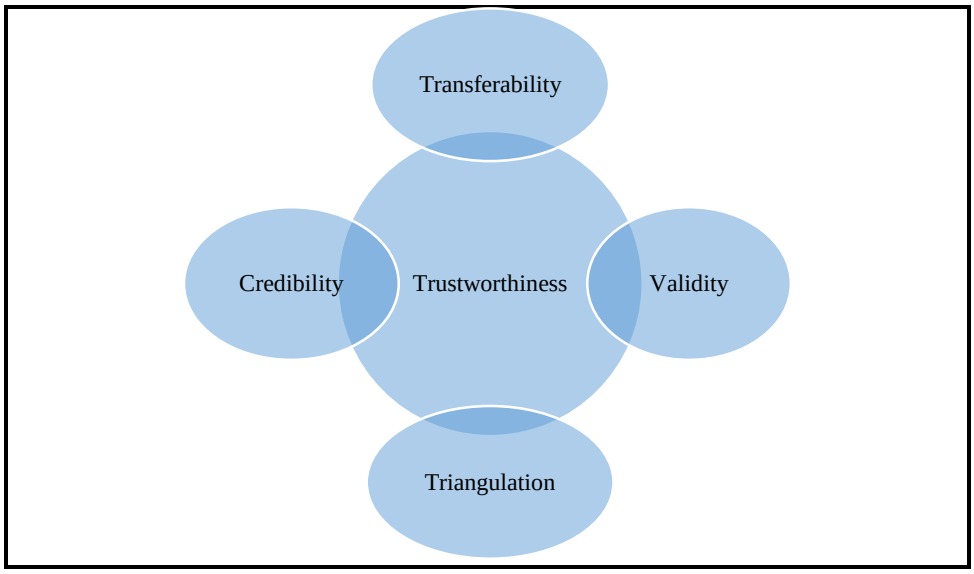


Figure 3.3 shows concepts that constitute trustworthiness in research.

Rolfe (2006) defines trustworthiness as a process in which the researcher can convince the readers or audience that research findings are genuine and of good quality. Assessing the accuracy of qualitative findings is not easy. However, there are several possible strategies and criteria that can be used to enhance the trustworthiness of qualitative research findings (Cresswell, 2013). Concepts in the qualitative literature that address trustworthiness are validity, credibility, conformability, and transferability (Guba & Lincoln, 1981; Creswell, 1998). This means that a true reflection of data collected and data analysis should be done to validate the findings of this study. There are certain ways of improving the reliability and the validity of questionnaires (Creswell, 2013): one must ask the right questions, phrase questions in a non-ambiguous way and ensure that the items sample a significant aspect of what is intended to be investigated. In this study, educators were given wide scope to articulate their own experiences, knowledge, teaching and learning through data collection methods.

3.7.1 Credibility

Credibility refers to the value and believability of the findings. This aspect of trustworthiness is used to make sure that the researched findings are robust, rich, comprehensive and well developed through incorporating elements such as triangulation and member checking of data (Cope, 2014). To fulfil this aspect in this study, the researcher used reliable data collection methods such as a recorder and making notes. During the data collection process, she spent time with participants observing and interacting with them. Furthermore, the researcher discussed the participants' responses with them, so they could check if they were accurately interpreted and add information if necessary. Thereafter, patterns were detected and conclusions are drawn accordingly.

3.7.2 Conformability

According to Tobin and Bergley (2014), conformability is the degree to which the research findings can be confirmed or corroborated by others. Casey and Murphy (2013) assert that confirmation is the process of comparing data gathered from multiple sources to explore the extent to which findings can be verified. To comply with this condition, evidence of collected data will be safely archived for five years in case the findings get challenged. The researcher's supervisor conducted audit trials to enhance compliance with conformability.

3.7.3 Transferability

Transferability refers to whether findings can be transferred to another similar context or situation while preserving the meanings and inferences from the completed study (Leininger, 19985. Seale (1999, p. 45) advocates that transferability is achieved by providing a detailed, rich description of the settings studied to provide readers with enough information to be able to judge the applicability of the findings to other settings that they know. In this study, this aspect was fulfilled by making sure that the various strategies that teachers use to teach sustainability were clearly outlined in detail, and recommendations were given to the participants on how to advance their strategies.

3.7.4 Triangulation

Triangulation is one of the most important ways to improve the trustworthiness of qualitative research findings (Yin, 2003). It arose from an ethical need to confirm the validity of the processes, and in the case of studies, it can be achieved by using multiple sources of data (Yin, 2003). It is an approach that uses multiple data sources, multiple informants, and multiple methods to gather multiple perspectives on the same issue, and gain a more complete understanding of the phenomenon. Triangulation is used to compare data to decide if they corroborate (Creswell, 2003), and thus validate the research findings. In this study, data were collected in various ways such as semi-structured interviews, semi-structured observations and reflective activity. Thereafter, the researcher listened repeatedly to the audio recordings of the interviews, referring often to rough notes that were taken during the semi-structured observations to detect patterns and overcome misinterpretations; that made data collected more reliable.

3.8 Conclusion

To sum up, this chapter outlined how the research was conducted. It discussed the relevance of the interpretivist paradigm in this research. The research methodologies, and the design used in the study, including strategies, instruments, and data collection and analysis methods, while explaining the stages and processes involved in the study. Lastly, it outlined ethical considerations. The aim of the study was to understand the teaching strategies that geography teachers use to teach sustainable development.

CHAPTER FOUR

ANALYSIS, INTERPRETATION AND PRESENTATION OF EMPIRICAL DATA

4.1 Introduction

The qualitative research methodology in this research study was used to understand the teaching strategies that geography teachers use to teach sustainable development. A theoretical framework based on sustainable development assured the reliability and validity of the data collection measurement. In this chapter, the captured data from qualitative research are presented, analysed, described and interpreted in a systematic manner. The results are first presented as an analysis of the qualitative data obtained from the individual semi-structured interviews that were recorded.

Bertram & Christiansen (2016) assert that the interpretive approach involves deduction from the data obtained, and relies more on what it feels like to be a participant in the action under study, which is part of the qualitative research. Very often researchers rely on their experience of particular settings to be able to read the information provided by the subjects involved in the study – in this study, empirical data elicited from the participants by means of semi-structured interviews, reflective activity and unstructured observations.

4.2 Analysis, interpretation and presentation of empirical qualitative data

Table 4.1: Teaching experience in years

Participants	No. of years
Participant 1	9
Participant 2	6
Participant 3	20

Table 4.1 shows the number of years that the participants have been teaching sustainable development. The data reveal that these participants each had more than five years of teaching experience which meant that they were able to share the teaching strategies that they thought were suitable to teach sustainable development.

4.3 Academic qualifications

Findings from Yin (2003) indicated that teacher training is pivotal in teaching a subject effectively. Data about the participants' academic qualification to teach geography were elicited to understand if the participants had training in there studying the teaching strategies that they could use to teach sustainable development. Below are tables that outline background data about the participants to better understand the qualifications of the participants.

Table 4.2 Academic qualifications of the participants

Participants	Matric/SDT	3-year Degree	PGCE	4-year BEd	Honours degree	Master's degree	Doctoral degree
Participant 1	-	√	√	-	√	-	-
Participant 2	-	-	-	√	-	-	-
Participant 3	-	-	-	√	-	-	-

Table 4.3 Teaching subjects that participants are qualified to teach

Participants	English	isiZulu	Maths	Life skills	Social science	Natural science
Participant 1	√		√			√
Participant 2	√			√	√	
Participant 3	√				√	

Table 4.4 Subjects and the grades that the participants currently teach

Participants	Grade	English	isiZulu	Maths	Life skills	Social science	Natural science
Participant 1	6	√		√		√	
Participant 2	5	√		√		√	
Participant 3	7	√				√	

4.4 Findings regarding the research questions

4.4.1 What are the teaching strategies that you use to teach sustainable development?

Teaching social science in the Intermediate Phase requires educators with strong pedagogical grounding, and who understand sensitive environmental issues affecting the school. This is the opportunity to identify some of these complex environmental problems within the school context through various teaching strategies. These strategies must be seen to support learners' own learning and development. The participants saw the selection of suitable teaching strategies as the main priority for teaching about sustainability in the curriculum.

> T1: *Using discovery skills always triggers critical thinking in my learners by way of making them more proactive in dealing with lessons.*

The analysis of this finding identifies a discovery teaching strategy as the point of departure if you want to teach about environmental sustainability. This participant underscored the importance of having to allow learners to use their own instincts to identify and solve many of the surrounding challenges. This view was encored by T3, when she later referred to a discovery teaching strategy as one of the fundamental bases for teaching learners how to solve everyday problems in our environment.

> T3: *I always prefer my learners to use their critical thinking abilities to discover potential environmental threats in their school, and later how to solve them.*

It was clear that most participants like to give their learners enough opportunity to use their judgement and creative power to learn. The main reason for using this teaching strategy was to first give learners the opportunity to use their senses before they can be engaged in a later stage. At this stage, they learn to understand that observation matters in identifying environmental challenges, and any person can spot potential environmental problems.

> T2: *Many times, learners enjoy using their own observation first to identify a potential threat, and later ask their educator for confirmation.*

The analysis shows that only educators can give learners the opportunity to use their senses to identify an environmental problem. In turn, participants argued that later these learners can begin to trust their own judgement, which boosts their confidence and courage to confront little environmental problems head-on.

The second teaching strategy teachers used to teach environmental sustainability was inquiry learning. It was the view of participants that teachers should be as creative as possible all the time when dealing with environmental issues in their respective subjects. This was the popular

view shared by all the participants in response to this question. However, constraints exist in their contexts to challenge this notion. Among these constraints are limited resource availability, CAPS time constraints, and discipline problems owing to a large number of learners. The participants argued that since sustainable development is a vocational topic to teach, it is difficult to implement inquiry learning with ease.

> T3: *I am a firm believer in inquiry teaching strategy inside and outside the classroom situation. Learners are given an opportunity to conduct an investigation as part of the inquiry approach.*

In this instance, learners are given a problem to investigate with a view to providing answers or solutions. In the case of environmental sustainability, learners are given a problem to solve in their environment. According to the participants, learners are expected to follow a particular procedure or use their own to solve problems. Some learners are given a controlled environment as part of the simulation, while others are given an open system as part of their environment. It is through these environments that learners are required to use their skills to solve problems, and are ultimately expected to write reports reflecting how they have solved environmental challenges.

The third teaching strategy, which was the most common among the participants, was a whole-class discussion. The analysis shows that this strategy was common because of time constraints and is the easiest strategy to implement. It is difficult to implement other strategies owing to the high number of learners in the classrooms. This prohibits the teacher from using strategies that would enhance their understanding.

> T2: *Discipline is a major challenge in facilitating strategies that enhance sustainable development, so with whole class discussion, I have full control of the class.*

According to the participants, there is limited time to cover each sustainable development topic. Sustainable development is a vocational topic, but CAPS demands and time constraints make it impossible to teach it properly. On the other hand, it seemed the participants enjoyed using this strategy as they felt that learners could learn more from class discussions, and they could share their experiences with the whole class.

4.4.1.1 The need to teach sustainable development in schools

The need to teach sustainable development in schools is critical considering the magnitude of recurring environmental episodes that plague the world today. Hence, schools remain the ideal

place where responsibilities can be reinforced. This assertion was further argued by Participant 1:

> T1: *Learners spend most of their time at school. In this case, a school is an ideal setting to teach learners skills that they can practice at home.*

The most fundamental purpose of teaching sustainable development is to empower learners with the skills to practice sustainability measures to save the planet by minimising environmental degradation at large. In schools, learners are being exposed to various aspects of the environment, and they are taught to understand, conserve and respect the environment in view of the dependent relationship between nature and the environment. Such knowledge is obtained through the teaching of environmental studies.

> T3: *Parents need to come on board when we speak of environmental issues. It is pointless to teach learners skills that will be discouraged at home because of a lack of understanding of the relevance of sustainable development.*

Overall, the participants felt that it is important to teach environmental studies in schools. If learners are taught at school about the importance of preserving the environment, it empowers them to make a change in the school premises; they can use their acquired skills to teach their families and community members to be able to make a difference on a larger scale. Teaching towards sustainability also reminds us that pedagogy is a civic project; there are important ties between classroom and community (Wilson & Shulman, 1987). It is very interesting to note that Summers et al. (2003) supports this view as education for sustainable development enables people to develop the knowledge, values, and skills to participate in decisions about the way we do things individually and collectively, both globally and locally, that will improve the quality of life now and without damaging the planet for the future.

Teaching towards sustainable development is a global goal because its problems and solutions are importantly situated in local communities. In essence, sustainable development requires active and knowledgeable citizens, and caring and informed decision makers capable of making the right choices about the complex and interrelated economic, social and environmental issues human society is facing. This requires the broader process of social change known as social learning. This involves not only specific education and training programmes, but also the use of policy and legislation as opportunities for teaching and encouraging new forms of personal, community and corporate behaviour (Shiva, 2003).

T2: *I feel that if all teachers were to work together in enforcing sustainable initiatives within the school environment, attitudes of learners towards the environment may change.*

This affirms that sustainable development is not only taught or reinforced in geography curriculum but is also found in other subjects. The researcher observed that there were bins in the school for different types of litter. But these bins are not used correctly. When the researcher enquired about them T3 responded and said:

T3: *Bins are there but no one monitors them or reminds learners about the need to separate the rubbish for recycling purposes, so learners just use any.*

Image 4.1: Showing different recycling bins.

This shows that schools are trying to implement some initiatives towards teaching learners about sustainability, but there is no one who is driving this initiative. Since teachers seem to be occupied by the demands of CAPS they seem not to have time to monitor these activities, so they need to delegate duties and empower the children, as there are those who are capable and can ensure that bins are used effectively.

4.4.1.2 Evolution of environmental studies in CAPS

The curriculum reform process has for a very long time advocated environmental conservation. One of the official channels through which this important aspiration of both the international community and South Africa can be realized is by adopting a good educational policy. Educational policy is very clear about education for sustainable development, advocating the strategies at the level of schooling that will allow the implementation of these practices on a

meaningful scale (DBE, 2013). Uitto & Solaranta (2016) argues that the geography curriculum can promote learning about environmental issues across the curriculum. The teaching of social sciences incorporates a number of areas such as spiritual, moral, social and cultural development, key skills and thinking skills. This notion was unpacked by Participant 1:

> T1: *I feel that it is not properly structured because the practicability of environmental studies is not accommodated in terms of time, location and finances as most learners cannot afford to pay for field trips to designated places where they can learn about such issues.*

It is interesting to note how the participants critically analysed the aims of evolving environmental studies in the CAPS document. They had read the policy document and detected loopholes that would help the teachers to find other ways to overcome the challenges that they encounter. It is easy to put policies on paper, but it is difficult to implement them as they may require certain entities to make them possible to put into action.

> T2: *The goal of CAPS is to educate students to be well-informed, environmentally literate citizens who have the capacity to become active participants in the local and global community.*

The analysis revealed that participants felt that it was difficult to practise what is written in CAPS. CAPS has no compulsory slot for practising environmental initiatives. This goes back to how the teachers are taught to teach this topic in their training colleges.

> T3: *This is where the biggest loophole is: where are we going to get the time to practice sustainability initiatives?*

Generally, participants felt that time should be allocated for such things so that specific attention can be given to facilitate sustainability initiatives. There is a project called “your bottle is your brick” that T1 is trying to facilitate within the school. It is rather difficult because not all educators support it, but it seems like a good recycling initiative. It was started by T1, who read about it on the internet and was motivated to begin it at school. Learners were encouraged to bring at least one bottle a week or even more. These bottles are filled up with waste (chips packets, sweets plastics and other types of daily waste).

Image 4.2 showing a school that is built with bottles.

This image is used as an example to show the aim of the project. On the school premises, there are numerous bottles that have been collected by learners. They are still collecting them to build with, and this will be encouraging to them when they see how useful waste can be.

4.4.1.3 Teaching strategies relevant to environmental studies

There are many aspects to consider when choosing relevant teaching strategies. These include the geographical location of the school, the classroom size, the number of learners in the class and resource availability. The school is located in an urban area, and there is a minimum of 30 learners per class, with enough space to conduct the desired teaching strategy. There are a computer room and an overhead projector which can be used to show videos. The school has Wi-Fi available so that teachers can access the internet at any time. The problem is that teachers were not trained to use technology effectively.

T1: *I was not trained to set up an OHP, and there is one room allocated in the school. That is disturbing because my teaching is limited to the availability of the computer.*

The training of educators to use available resources in the school is important. It is no use having a computer in the school that no one can use.

T2: *I can only print out pictures that I wish them to see..*

This means that teachers get to use the teaching strategies that are easily implemented and for which equipment is readily available. It is interesting to note that even the teachers in the resourced schools experience challenges in using technology and accessing the limited

facilities that they have. Teachers use resources that are convenient for them to use considering discipline, classroom size, and availability. Discipline is a formidable challenge to teachers as learners' behaviour determines the success of the lesson. In most cases, when learners are put into groups, there tends to be much noise if they are not closely monitored.

> T3: *I find it easier to maintain discipline when using the whole class discussion because I get to be the facilitator of the discussion and the centre of attention.*

Many schools possess a predictable faultline where teachers rely on textbooks to teach. Creativity and experimentation need support from colleagues, which is a burden to ask of them because they are overloaded with work in their specialization (Capra, 2007). The researcher sensed that participants felt that they did not have much choice in choosing strategies that are relevant to teach sustainable development as they used what was convenient for them. They felt that time was too short to teach this topic vocationally.

4.4.1.4 Curriculum support for the use of these teaching strategies

Whole class discussion

Findings from the participants indicate that whole class discussion is the most implementable strategy when teaching about matters of environmental awareness. The challenge of overcrowding in this school has necessitated the division of classes into smaller groups in order to teach effectively. Teachers face the challenge of overcrowding, making it impossible for them to implement some notable teaching strategies like group discussion, which is easy to organise and makes teaching accessible to all learners. According to participants, small group discussion allows learners to learn as groups, assisting each other during the process to identify environmental problems as a team. Sometimes they can solve environmental issues that otherwise would not be possible to solve individually.

> T3: *Let me educate you about these kids. They open up to many possibilities provided they are working with their peers. When I try to interfere in their work some just retreat because they are uncomfortable. Their peers give them the confidence to learn about outdoor activities linked to environmental sustainability.*

It was the same recollection given by T1 about the need to reinforce the spirit of togetherness when teaching our learners. You can even observe them working together without interruption where issues concerning environmental challenges are raised and resolved. This strategy presents an opportunity for sharing ideas holistically triggering a problem-solving attitude that has long-lasting impact.

T1: *Using group discussion motivates learners to engage in activities with confidence and zeal. It is stimulating to learn that young learners are keen to get involved in environmental activities compared to adult learners.*

Most learners like this idea of group discussion very much, and it stimulates their ability to work more closely with their peers. In promoting group discussion, the study participants indicated that discussion planned along these lines is likely to stimulate debate about certain controversial issues affecting their society directly. One of the most contested issues is water shortage and water pricing. According to Participant 4, learners understand the impact of water scarcity on both commercial and human consumption.

T4: *Our streams are getting drier and more overly drained as the result of water scarcity in Southern Africa… This issue continues to threaten human survival and make it even harder for future generations to derive any future from this most damning global phenomenon.*

This was among the few areas of environmental concern raised by participants which learners always discussed during small group discussion. The researcher finds joy in listening to these future leaders unbundling some of the complex global problems the way they do. In other words, teaching learners at their young age to analyse global events which are currently changing the course of history brings happiness into the researcher's class. The preparation for a small group discussion where one topic related to environmental sustainability is discussed is enormous, and it requires well-balanced teaching strategies that will allow almost all learners to participate.

Roleplay

Using role play and dramatization stimulates critical thinking for both teachers and learners during the preparation and implementation stages. Drama allows authentic voices to be heard through a role. When using drama methods as a teaching methodology, an educator must ensure that all learners have their roles to play. This will allow the opportunity for their true voices to be listened to. In addition, various ideas about sustainability measures can be shared and realised through a role-play scenario.

Group work

Group work is a good strategy to use when teaching environmental issues. Learners get to learn to tolerate each other and to equally split work to be able to work in a team. On the other hand, facilitating group work is hard because learners get noisy, and some may be intolerant of other

members of the group and may prefer to work alone. In contrast, learners learn from each other in their groups and can share their ideas with their mates.

Sisely (2003) supports this view: she states that people do not become environmental agents by themselves over time. It is a continuum of proficiency which begins with discussions, environmental awareness initiatives, and ends with action where people engage in environmental awareness programmes in schools and communities. Therefore, group work is essential in this regard.

Field trips

When learners are taken on field trips, they get exposed to real life situations and are encouraged to think of ways to reduce environmental degradation. Affordability also needs to be taken into account because if most learners are on fee exemption, they are more likely to be unable to afford to go on field trips that are far away. Local places need to be taken into consideration because environmental problems are everywhere.

Using ICT

In the data analysis, the issue of information, communication, and technology (ICT) surfaced to underscore the need for its development. It was clear from the interview process that using sophisticated technology could increase awareness in learners and members of the society of the need to live in harmony with the environment. All the participants felt strongly about the fact that ICT can help teachers to present sustainability content in ways most suited to individual learners and personal needs. This promotes inclusivity which requires that teachers should develop and design our schools, classrooms, programmes, and activities so that all students learn and participate to reach their full potential. Lack of access to ICT is critical in some schools, while others have the privilege of having access to appropriate technology and space to facilitate learners' development.

> T2: *When a video is put on to show learners environmental issues there's a language barrier to non-English speakers, particularly with an accent, so learners don't really understand what happens in videos, so I try to look for appropriate child-friendly videos that will catch their attention.*

4.4.1.5 Educators' level of understanding to use teaching strategies to teach sustainable development

Teachers have a unique role to play in order to transform the curriculum towards education for sustainability. The role of the teacher is to be a lifelong learner. This entails learning about the nature of the changing world as part of a data gathering exercise. That said, teachers need to continually search for more practical teaching strategies that are beneficial to learners by improving their knowledge about sustainability in their local environment. The search for more efficient and practical teaching strategies may be more urgent now as many unexplained events of a catastrophic nature are triggered by our actions. Participants indicated their willingness to address environmental problems at their school, but the school managers are not supportive. This is due to the lack of urgency in understanding environmental problems facing the world today. Their response shows that teachers always try very hard to align their teaching activities to issues directly affecting their environment. In many instances, they argue that brainstorming about relevant teaching strategies that are effective is challenging. Participant 1 stated that teachers are responsible for their own development in line with the demands of the curriculum. As such they should inquire of and interact with colleagues at nearby schools to share ideas that will shape much-talked-about teaching strategies that might have a serious impact on the education about environmental sustainability.

> T3: *I facilitate basic computer overrun for those colleagues who are struggling with computers.*

The use of computers in South African schools is gaining traction according to T3. However, teachers are not capacitated to take advantage of the available platforms. Some of the software can download environmental features showing the benefit of environmental conservation, while others depict environmental disasters resulting from bad environmental planning. This view confirms the difficulty expressed by T1 that some teaching strategies that may enhance the teaching of sustainable development are not used effectively because teachers to use computers in their schools. Sometimes the computers are old and not properly maintained to perform relevant activities such as searching for basic information. Linked to this challenge is the inability to access these computer facilities, Here I mean there are personnel assigned to control access to these computer centres at our schools. Good documentary videos are useful and can be used as powerful teaching strategies if they are made available to schools. According to T1, some of these videos are easily accessible provided the school management teams allow us, teachers, to purchase them.

T1: *I can state with certainty that video material on much environmental sustainability and other related case studies showing areas of good practice should be ordered for teaching and learning. My school is currently reluctant to use these materials for teaching and learning.*

Schools are aware of the need for advanced teaching material and teaching strategies. In essence, the power of technology is seen by participants as the panacea for predicting major environmental threats and disasters before they happen. The use of computer simulation triggers environmental dimensions never thought possible, but this method educates learners to respect and protect the environment against any human abuse. Linked to this question of technology was the need to question the inability of schools in Pinetown to promote teaching using OHPs which promote visual representation of any environmental issue under investigation.

T4: *The idea of using OHPs in school cannot be overstated, considering that most teachers have managed to access PowerPoint through their private computers. I cannot but enjoy the creativity of teachers when using an OHP. However, setting up an OHP is a mission for some of us in the school. My friend is a specialist when it comes to the setting up of an OHP, and I have learned so much from her.*

In was evident that the participants all thought that teachers should be empowered to use different strategies that may be beneficial to learners. Some of these strategies can be derived from the technology available at our disposal, but training opportunities should be available for teachers to achieve the necessary skills to use these platforms to their full potential. The way the teacher thinks shapes education; that is why all tools needed to make a positive contribution to teaching should be embraced. McKool and Gespass (2009) argue that the need for quality training of teaching in the use of computers is paramount, and that personal teaching habits are influenced by the way the teacher was taught at school, how they were groomed at college and their socio-economic background. These experiences build a teacher's personality, and there is room amongst them for modern technology to highlight the new global culture of environmental neglect. Teachers develop habits in their place of work – they tend to do what is easiest to do, and adapt accordingly. For example, it is within the ethos of the school to appreciate the school by practising environmental management programmes to enculture learners about preserving and being responsible for preserving the environment.

4.4.2 How do teachers use the teaching strategies to teach sustainable development

4.4.2.1 Involving social science learners in problem-solving activities linked to environmental issues

The existence of social science-related subjects like geography is deliberately to instill a love for the environment around us. The main goal of environmental education (EE) is to produce citizens who are informed about the biophysical environment and its related problems. In this instance, schools should be used as the basis for championing environmental awareness by introducing problem-solving skills as part of the curriculum. This will provide platforms for people to be aware of the possible solutions that can be implemented to contain those environmental problems, and actively engaged towards working to find their solution (Herrick, 2010). Hence, the findings of this study reveal that participants understand the importance of involving learners in problem-solving activities which are linked to environmental issues. This strategy exposes learners to basic environmental challenges that can only be solved through following basic steps of problem solving. It gives learners first-hand experience in confronting a problem head-on while seeking for a solution as they become problem solvers. One of the participants, who strongly believed in the principles of problem-solving techniques, argued that only teachers and schools should be change agents. The practice should empower learners to influence their immediate family members on the concept of environmental problems plaguing the country and the world in general. In using problem solving, learners learn leadership skills as they become empowered to be ambassadors to facilitate the problem-solving initiatives, not only in their schools but in their communities.

> T1: *Identifying existing problems that learners can relate to is the first step wherein learners can begin the process of investigating these problems. I sometimes use a simple problem of water wastage happening in our school and give them the opportunity to solve this minor problem on their own. Sometimes I expose them to community service, when learners come together on a weekly basis to deal with environmental problems around the school."*

In the beginning, participants expressed interest in using problem-solving techniques. However, it proved to be the most challenging task for them. It was interesting to note that there is a voluntary group called "community service learners" who devote themselves to caring for the environment. Through this group, learners are invited to make a contribution by cleaning the local river, distributing pamphlets on how to minimise waste, going door-to-door spreading awareness about environmental protection. T2 further asserted that group tasks and

presentations are activities that are commonly initiated to challenge learners to think critically about the causes and possible solutions. Overall, there was a common view that practicals in teaching sustainable development are seen to be the most beneficial way to get learners to be more inclined to and more understanding of the concept of sustainable development. Hence, identifying local environmental crises by this voluntary group has proved beneficial in the quest to solve small-scale environmental problems.

> T2: *In my local community, people have shown that they have no interest nor desire to solve environmental problems affecting them on a daily basis.*

This situation proved to be the norm in most communities in the greater Pinetown region. When learners visit their local community, they get very little response mostly affected by problems of litter and water shortage. The target, according to T1, should be young learners who are still innocent and can see no colour on issues facing community across racial lines.

4.4.2.2 Identify local environmental crisis as the basis for their teaching

There are many documented environmental problems facing our local communities in South Africa today, and these have the potential to inflict more damage to our ecosystem than before. It was clear from participants' responses that local problems require urgent attention from communities and government intervention. Participants kept on using local examples as an ideal method of teaching about environmental issues in our schools. The understanding of local environmental crisis was given by T2, analysing how she used this as a teaching strategy to improve awareness to learners.

> T2: *In recent times, we have observed more waste generated by our local communities in townships, and this has widely impacted negatively on the quality of water in these local streams; hence small marine animals have ceased to exist in these rivers.*

One can deduce that our actions carry weight for the survival of our local environment. One of the classical examples that were highlighted by T4 made a huge impact on understanding local environmental challenges facing our existence. This participant spoke about environmental auditing where his class was involved in an environmental auditing exercise to check how much waste is accumulating in the local streams. The audit report revealed damning evidence of ignorance in the members of the public when it comes to litter in open spaces.

> T4: *This so-called audit was driven by my curiosity to have a better understanding of the attitude of the community towards their public resource like the river. Learners and the*

member of the community who voluntarily assisted made a shocking discovery about the attitude of local people towards their own environment.

The nature of this painstaking analysis of how the local environment cascades from a local to a global problem was fascinating to learners. According to data analysis, most of these local environmental problems affect us daily, and their impact is unimaginable and difficult to comprehend. Learners are taught how to identify and deal with these problems at the elementary stage by infusing environmental education into the curriculum. Most participants said that pollution (littering) is a common problem that affects us in our schools and communities. When participants were asked about the littering problem, T3 responded and said that "littering is closely associated with behaviour that is considered right or wrong."

T2: *The question of littering affects us in many different ways, it requires us to reinforce values of Ubuntu as one of the principles of humanity, and love for the environment is supposed to be enforced at home but is regarded as a burden.*

This view is similar to what T1 said during her interview, that values such as respect and responsibility for one's actions need to be reinforced because, at the end of the day, we are all responsible for taking care of our environment.

Image 4.3 showing learners actively picking up litter.

T1: *Let me tell you, my dear, our school is highly disciplined, and our learners are constantly reminded to pick up litter within the school premises. This value has been entrenched as they are very sensitive to litterers. When they see peers litter, they report immediately.*

In contrast to this, T2 had a different view of another issue of pollution emanating from the litter of chemical substances that end up polluting our water. This participant took the time to explain how litter and recycling have become a challenge that needs constant monitoring. Water is a precious resource that teachers cannot exaggerate the importance of preserving. As the researcher observed, there are JoJo tanks at the school, but they are not used at all: taps leak and learners leave taps running at the break. The participant argued that as schools they are the custodian of nature, but learners do not respect this precious resource at all. This showed the researcher that the learners are not cautious about the importance of saving water. Saving water is a national problem, and there are places that do not have enough. This is evident as there are water cuts regularly to save water.

T3: *Can I brief you on the culture in this school? The SMT has taken interest and focuses our school on recycling litter. Water is not our priority. The school is getting donations from these companies that deal with litter for their recycling operation.*

However, this did not mean that learners are not taught or reminded about saving water. Learners learn certain habits from their immediate families and want to repeat at school. Hence, they are more likely to do as they do at home. It is difficult to reinforce values that are opposite to what they do at home.

4.4.2.3 Use global environmental forums and advocacy in preparing lessons

The evolution of an environmental agenda for sustainable development saw the emergence of interest in various countries. This evolution derived its strength from many conferences held worldwide to champion environmental ethics and paradigms. The participants demonstrated a fairly general understanding of the importance of these global forums of sustainable development. These environmental forums continuously seek to map an agenda that will protect pristine environments for future generations. T4 seemed to know the goals behind the emergence of a global agenda on sustainable education and development as espoused in the CAPS. The main challenge, though, is to expose this global agenda to local schools where all the common environmental issues can be mitigated and later solved permanently. Information

on this subject resonated with this study when participant T2 gave his account of environmental forums.

> T2: *Teachers can benefit from the environmental forums, but in most cases, they are too expensive, and that makes it even more difficult to attend them. Suffice it to say that as teachers we can only use important resolutions adopted to champion environmental ethics and perspectives, but also align them to the curriculum, a framework called CAPS.*

The local municipality and Department of Education attempt to organize workshops for teachers to empower them on matters related to sustainability at the local and regional level. Recently there was a conference about sustainable development measures held at Edgewood campus which was free of charge. In that conference, presenters showcased their work on environmental conservation and awareness. In the words of one of the teachers, this platform was made available to all stakeholders and policymakers who champion environmental education in their respective organizations. However, at that conference, there were more organizations than teachers or members of society. When asked about this, T3 responded and said:

> T3: *I never heard of such a workshop. If I had heard, I would have gone.*

This shows that there may be a communication problem between the municipality and schools, or between principals and teachers.

> T1: *I once attended a very informative social science workshop organized by the Department. It was so informative, as we got some resources, and we were given ideas about how to go on about teaching sustainable development.*

However, that workshop was five years ago. The participant felt that having the workshop annually would be beneficial not only to the more experienced teachers but to the new ones, who could advance their skills the correct way.

According to findings, Participant 2 emphasized that teachers need to improve students critical thinking through the classroom by facilitating debates which will give alternative perspectives and solutions of a particular problem. According to Capra (2007, 84), "A devil's advocate role is typically played by an individual who provides alternative perspectives and solutions to problems, frequently challenging group assumptions." Applied to the classroom, playing devil's advocate means a teacher or student takes the opposing side of the predominant argument. It may not change the students' minds, but using the devil's advocate approach challenges them to expand their analysis, perspective, and understanding of an issue. As Capra (2007) states, the utility of such teaching strategies is measured by their contribution to the

overall goals of helping students learn to analyse logic and assumptions, to critique the validity and soundness of arguments, and to come to true understanding. T2 asserted:

> *'When I employed the devil's advocate pedagogical approach in my classroom, students learned how to think critically by analyzing, evaluating, and engaging in problem solving sustainable development initiatives'.*

However, this strategy does not imply any practical action that the individuals engage in to solve environmental problems. They learn, but they do not practise what they learn, which is a concern, because the knowledge that is not used is useless.

4.4.2.4 The use of mapping to identify areas prone to environmental disasters as a case study

Many natural disasters happen worldwide, but the geographical location of a place may make the area invulnerable to natural disasters. Mapping areas according to their geographical location as a case study is pivotal to know areas that are prone to environmental disasters.

T1: *An atlas is an integral part of our teaching*.

Participant 1 prefers using an atlas so that learners can get used to finding places and knowing their geographical positions. Her reason is that she feels that learners should not be technologically inclined in everything. An educational book like an atlas provides rich information about the geographies of the world.

On the other hand, T2 feels that learners can watch videos to identify these areas. YouTube gives more information about a certain place. Searching on the internet for areas that are prone to environmental disasters saves time, says T2. In contrast, T3 seemed to agree with T1:

> T3: *Learners need to have an understanding of the different parts of the world, and that can be clearly visible in an atlas.*

Socially and economically marginalized people and environmentally vulnerable areas are disproportionately affected by natural hazards. Identifying populations and places vulnerable to disasters are important for disaster management and crucial for mitigating their economic consequences. The Geographic Information System (GIS) software is one of the effective tools to develop spatial information in order to prevent disaster. The result of interpretation by GIS shows non-disaster areas and disaster-prone areas within its range.

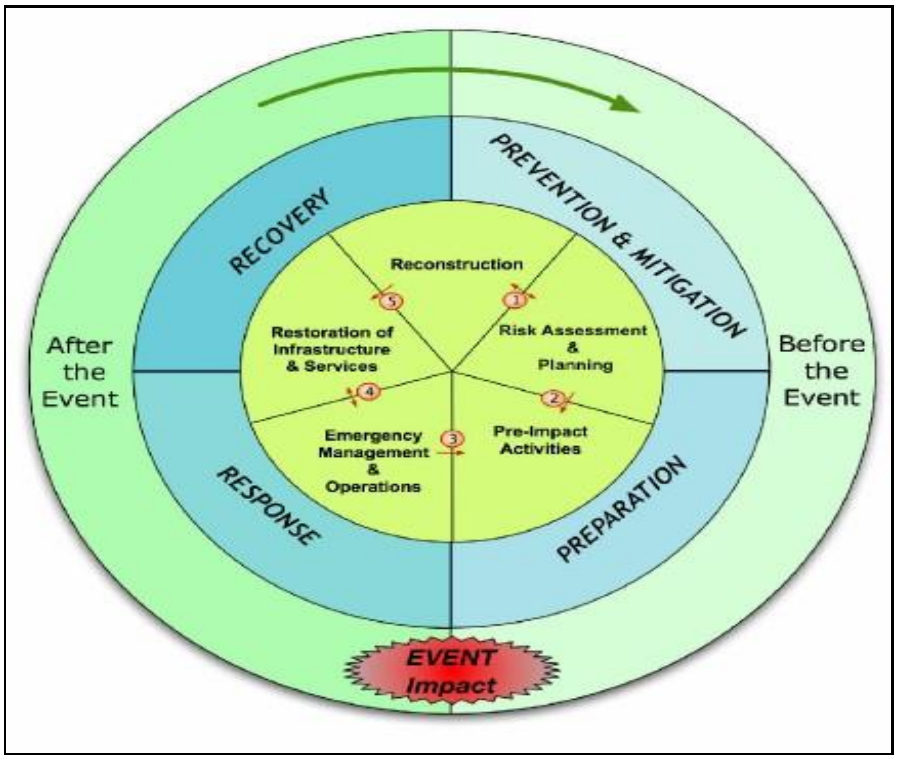


Plate 4.1: Showing disaster management cycle.

The preparedness phase GIS can be used for emergency planning and its dissemination to the different organizations involved in natural disaster management (NDM). The prevention phase is maybe where the GIS plays the most active role. With the historic disaster inventory, the environmental parameters, triggering factors and elements at risk it is possible to do modelling in a GIS context to obtain the Susceptibility, Vulnerability, Hazard and Risk maps. They are very valuable for NDM since they provide information about the spatial variation of a potential disaster, how it can affect the human environment and which spatial strategy plan can be developed to reduce the potential disaster. The response phase GIS can almost immediately map the extent of the impacted areas and manage the search and rescue operation, the activation of the emergency plan and the distribution of the resources considering the best routes available. In the recovery phase, GIS is useful for the damage assessment survey and recovery analysis. In this sense, all post-disaster data surveyed are integrated into a GIS and its statistics will show which areas have been affected ted and how extensive they are. Then, it is possible to model a recovery plan and run it in GIS.

GIS is an integral part of the geography curriculum. Learners are taught the GIS functions theoretically; they should be taught how to use GIS software such as the Arch map on the

computer. Hence the obvious challenge is that many schools, especially in marginalized places, do not have access to computers. On the other hand, many teachers do not know what GIS is, and how to use it.

> T3: *I have never seen GIS software, never mind using it even at the campus where I did my training, the emphasis was not placed on GIS.*

Emphasis was placed on the importance of exposing learners to computers in lower grades. This would enable learners to be familiar with different software.

4.4.2.5 Using online videos and YouTube material as teaching strategies

Research findings suggest that using online videos and YouTube is beneficial in teaching learners about sustainable development. This is because of the environmental issues that affect sustainable development can easily be accessed through YouTube videos.

> T1: *YouTube videos help learners to see what is happening in places around them or further.*

Since we live in a technologically advanced world, learners are captivated by the videos that they watch. There is another side to this as revealed by T2:

The English accent in the videos makes it difficult for learners to understand what is happening in the video. Language is a problem since 99% of learners in my class are isiZulu speakers.

Research findings suggest that learners enjoy watching videos. There was a common view that there are fewer discipline issues when learners are watching videos because they often learn something new and become interested in watching something that they are not familiar with.

McKool and Gespass (2009) observed that using educational videos to communicate a topic is indeed engaging and insightful, but adds that it also enables students to acquire a range of transferable skills in addition to filmmaking itself. These include research skills, collaborative working, problem solving, technology, and organizational skills. McKool and Gespass (2009) show that there is strong evidence that digital video reporting can inspire and engage students when incorporated into student-centred learning activities. When observing, the researcher found that a group of students in a class were so excited when they knew from their teacher that they would be taught a new lesson by using video. Then, after a few couples of minutes waiting for the video to be turned on, the students' mood went slowly down: they seemed to be getting bored and tired of waiting because the teacher had a technical problem which she idea how to handle. That kind of situation must be anticipated by the teachers because it will

influence teaching and learning. Teachers must develop themselves as creators, producing videos to fulfil their students' needs in learning activities.

4.4.2.6 The use of indigenous knowledge in the teaching of sustainable development

Indigenous knowledge is a growing field of inquiry both nationally and internationally for those interested in educational innovation. Hence indigenous academics continue to strive to reveal the wealth and richness of indigenous languages, teaching, and experiences (Elliot, 2008). Indigenous knowledge has often been represented by the term "traditional knowledge", which suggests a body of relatively old data that has been handed from generation to generation.

Research findings seem to show that children's prior knowledge can significantly influence classroom teaching and learning. It is important to note that a child's knowledge is based on his or her interaction with different settings. The primary discourse, which is with the immediate family, serves as a foundation for the values that a child possesses. T1 felt that the older generation often have rich knowledge, which is not scientific, but indigenous, based on their past experiences. This was supported by T2:

I feel that education does not only take place at school but also at home.

Participants pointed out that learners do not come to school as empty vessels, they come with their experiences, with what they are taught at home, and with the knowledge they have gathered from media or other settings. Indigenous knowledge has become an important attribute in the body of knowledge Cultivation of individuals' responsibilities to their communities becomes a dominant objective of the teaching and learning process in indigenous education.

4.4.2.7 Use of local environmental agencies such as the Wildlife Environmental Society of South Africa (WESSA)

WESSA is an environmental organisation which works closely with local schools to educate learners about the importance of preserving the environment. Schools that work with WESSA become eco-schools. Active involvement in initiatives to save or care for the earth should be in evidence before they get their memberships. When the participants were asked about their involvement with environmental organizations, T1 asserted that the school participates in the "Litterless campaign", a world-wide initiative to minimize pollution.

T2: *I honestly do not know what WESSA is about.*

This view means that some educators have little information about the environmental organizations that exist locally. As a geography teacher, getting in touch with the local environmental organizations may help to broaden understanding of sustainable development. Furthermore, learners will be encouraged to act in a sustainable manner if they see that there are such organizations which are dedicated to caring for the environment.

Participant 3 asserted that inviting guest speakers from environmental organizations on environmental days is beneficial to the school. This was followed by the view that learners are more interested in learning from outside people who have experience and who can answer their questions adequately. These guest speakers share their experience and have exciting ways to encourage learners and give them tips on how they can help to save the earth.

> T2: *Guest speakers give learners tips and our ideas on projects that we can initiate in school.*

Today's curriculum requires the teaching of environmentally related topics such as climate change, food security, national and cultural identity, interaction with nature and managing waste. Through experiential learning learners are prepared and guided to fully engage in these environmental topics, becoming proactive, flexible, creative and outspoken ambassadors for the environment. WESSA programmes aim to prepare learners and youth for their future by providing a context in which they can hone their skills and gain the confidence needed to make a difference through their engagement in project-based work.

Figure 4.1 showing WESSA action plan.

The above diagram shows seven steps that schools can follow to be part of an eco-schools' programme. The participants revealed that they participate in some of the steps that WESSA requires in order to be recognized as an eco-school, but they did not know the steps and that they had to be listed as an eco-school. This shows that they were not informed about the project.

4.4.2.8 Integrate recycling, reusing and reducing in the social science and science curricula.

The notion of integrated waste management has been used to shape the curriculum reforms in South Africa. The go-green campaign is based on the notion that people should reconsider before replacing and rethink before buying. The triple R campaign is there to help people save money by not buying unnecessary items to save the earth. Recycling, reusing and reducing has many benefits, as outlined by T2. T3 pointed out that the school benefits economically from recycling initiatives. There are many local companies who buy plastic bottles, glass bottles, cardboard and scrap paper produced by schools, businesses and the community. The researcher was intrigued by the initiative taken by each class in the school as asserted by T3

> T3: *Each class collects bread tags, if 1 million bread tags are collected, a school can get a wheelchair and donate it to a child who needs it.*

That was so inspirational to the researcher as she realized that recycling is so significant in community empowerment. The mind sets of members of the society have not been transformed to take advantage of waste generated as a resource. Interestingly, as participants indicated, there are many people who make a living from selling recycled materials. T1 asserted that learners are asked to bring recyclable materials to school, and then they are asked to make something useful out of them. It was a good way of teaching them how they could recycle materials. On the other hand, findings reveal that the recycling bins in the school are not used properly. The initiative is there, but not initiated properly.

> T2: *Look at how this school looks from outside, very well looked after, but our attitude towards litter and waste classification is lacking. As a social science teacher, I rather focus on one initiative at a time, as many initiatives are hard to maintain.*

This view was supported by the researcher's observation of recycling monitors in the schools. Those learners are recycling ambassadors, and they go around the school to remind learners about taking responsibility for their litter.

Figure 4.2: Recycling trilogy.

The three Rs: reduce, reuse and recycle, all help to cut down on the amount of waste we throw away. They conserve natural resources, landfill space, and energy. This trilogy shows exactly how these three Rs can be practised. Reducing environmental degradation can be practised by saving energy, using lift clubs with colleagues instead of driving your own car, using less water than usual. Reusing can be practised by reusing biodegradable materials such as reusing shopping bags. Lastly, recycling can be practised by using different bins for different litter.

4.4.3 Why do you use those teaching strategies to teach sustainable development?

4.4.3.1 Enhance the rationale for curriculum

Research findings reveal that the participants use their teaching strategies to enhance the geography curriculum. The geography curriculum can promote learning across the curriculum in a number of areas such as spiritual, moral, social and cultural development, key skills and thinking skills. The aim of the geography curriculum is to create the type of learners that identify and solve problems, make decisions using critical and creative thinking work effectively as individuals to collect, analyse and interpret information, and show commitment towards sustainable development (Uitto & Solaranta, 2016). It is evident in the CAPS document that geography is a multidisciplinary subject that quite simply develops pupils who can analyse and understand the world around them. This results in their developing ability and

willingness to take positive action, both locally and globally, as geographers are the agents of change.

T1: *I do a bit of groupwork where learners are expected to do research and make a poster presentation.*

Teachers believe that the CAPS document is absurd if one takes into account the predictable outcomes within a specific timeframe. There is another side to this, which is that the Department's officials that do not consistently offer guidance on how to teach certain topics.

T2: *Seven years ago, I once attended an informative workshop about teaching social sciences.*

There was a general feeling that the subject specialists should come on board when it comes to directing teachers on how to teach certain topics, in view of the socio-economic status of the school. Although Participant 2 revealed that there was a fruitful workshop seven years ago. it is disturbing that workshops are not conducted annually to empower the new teachers and advance the older ones. Many policies have been developed across the world to make teaching and learning possible and efficient, but the greatest challenge lies in implementing these policies (Schulman 1986 p. 93). The Departmental policymakers characterize teaching as the practice of organized, systematic learning, and typically assume they have a relatively stable schooling system with relatively predictable roles for teachers in that system. This is problematic because it does not take into account the external variables such as the classroom size, the number of learners, the availability of resources and the social background of learners. As a result, teachers have an added responsibility to try and overcome these conditions by trying to find alternative ways to teach, by critically analysing the roles of teachers.

T1: *Whole class discussions are easily manageable.*

The view above is expressed by participants in this research in terms of understanding the complexity of sustainable development issues, the nature, and interconnectedness of its sub-concepts, and its value-laden nature reflected in contested meanings and differing aims. These are similar in nature to features of the subject matter described in the literature from McKool and Gespass (2009) and noted in the conceptual background. The other view is the teacher's recognition that the complexity of subject matter to do with sustainable development, including its associated concepts, presents challenges when thinking about how to teach this area. When participants were asked about this, they felt that sustainable development is time-consuming and requires a deep understanding.

4.4.3.2 The need to streamline pedagogical content knowledge with the sustainable development vision

Pedagogical content knowledge and sustainable development are inseparable as the latter affects our everyday lives. Hence, geography teachers need to understand that environmental issues are complex, intangible and may require different pedagogical techniques when integrated into subject teaching. In this context, an indigenous knowledge system plays a pivotal role in understanding the virtue of sustainable development. In this study, when teachers were asked what they knew about sustainable development, they showed little understanding of the information they teach. This has a significant impact on the effectiveness of sustainability in schools as it means that geography teachers lack an understanding of the content knowledge in teaching sustainability.

T2: *Honestly, I heavily rely on the textbook since it is CAPS-compliant.*

This view states that teachers are sensitive to subtle themes presented in textbooks, and could modify the text material based on their teaching experiences. This and other studies show that pedagogical content knowledge is highly specific to the concepts being taught, is much more than just subject matter knowledge alone, and develops over time as a result of teaching experience. However, it is questionable if teachers who teach sustainable development understand the concept, and if they are teaching correctly. When asked about this, participants had different views about what sustainable development means.

T3: *Sustainable development is economic development without affecting our natural resources.*

. Learners have various experiences within their families and communities at large. Therefore, empowering them to be agents of change and environmental protectors needs learners to have a strong understanding of the content that is taught in class, and values such as respect and responsibility should be enforced at school and at home. All knowledge is created as individuals and groups adapt to and make sense of their experiential worlds. In support of this, Capr (2007) argues that through collaboration teachers gain numerous advantages such as moral support, sharing workloads, eliminating duplication and increasing collective confidence about innovations. Therefore, sharing of knowledge among peers helps to shape the teachers' pedagogy in the teaching of sustainability.

Many teachers feel that it is challengeable to implement sustainability measures within the school environment. Therefore, given this emphasis, it is not surprising that the conception of sustainable development used by geography teachers in their teaching relies heavily on the

Brundtland Commission Report which does not include the practical component of sustainable development and how it should be taught. According to Wilson and Shulman (1989), teaching sustainability is a civic project. This means that what learners are taught at school must be applicable to society at large. But this is not the case: most learners do not practise what they are taught at school.

> T1: *Although we have bins in our school, we have a lot of litter because learners are not practising what they are taught in class.*

Findings from this study suggest that teachers are uninterested in the practicability of teaching sustainability. This is evident in schools where they teach. The researcher observed that there is a sustainability culture within the school premises, but the problem is that no one is there to reinforce values that sustainable development embodies. For instance, the use of bins not monitored in schools. It is teachers who are passionate about teaching sustainability who are more likely to implement sustainability measures in schools. This implies that teachers lack the skill to integrate the practicability of sustainability. Teachers need to be trained about the use of the appropriate teaching methodologies to use for each level and be able to engage the learners according to their development level. Teaching should provide learners with strategies on how to make healthy choices that contribute to a meaningful life and a healthier society. A lifestyle choice is a personal and conscious decision to perform which may result in behaviour that may have a positive or negative effect on the environment. Teachers can use multiple strategies to create this environment, but the school garden has proven to be a very useful tool.

> T3: *It is a fun and effective way to introduce sustainability or go-green measures and provide opportunities for nutrition basics.*

Learners are empowered to develop each other by sharing their indigenous knowledge. Research conducted by King (2006) on the benefits resulting from school garden programmes has found that learners who plant and harvest their own fruit and vegetables are more likely to take responsibility for the environment.

Image 4. 3 showing learners planting trees on the school premises.

4.4.3.3 The agenda to promote education sensitive to sustainable developmental needs

Creativity and experimentation need support from colleagues, which is a burden to ask because they are overloaded with work in their specialization (Litchman, 2006). In the researcher's opinion, initiating action should be a holistic project done in the school and not by a geography teacher. Parental expectations, pressures from surrounding institutions, and some teachers own traditional inclinations have an impact on the implementation of sustainable projects in the school. In this research, it was interesting to note that teachers find means other than classroom teaching to make an understanding of sustainable development more fruitful.

> T2: *There is a community service club in the school for learners who are environmental warriors.*

As noted by T1, it is good to have a voluntary dedicated group to work with and to teach them the importance of sustainable development. These learners set an example to the other children. However, it was surprising to find that none of the participants were involved in the eco-school warriors programme. On the other hand, it was interesting to observe that one does not have to be a geography teacher to initiate sustainable development measures within the school premises. This shows that sustainable development education is a holistic project and is not specific to geography education; it is also found in other subjects.

T3: *I once taught in a litter-free school as a Physical Education teacher. That is where I understood more about the importance of conserving the environment.*

4.4.3.4 The only chance to save the planet earth

It is very important to keep the natural world clean in order to live a healthy and peaceful life. However, environmental pollution has become one of the biggest threats to the earth. It affects us every day. People suffer from their own mistakes. Pollution endangers our existence and destroys our living environment. The future will either be green or not at all. Different strategies that are used in schools to unpack sustainable development may be our only chance to save the earth. How a teacher goes on about doing a lesson is dependent on his or her creativity. Many teachers find additional resources such as searching on the internet for exciting information to share, and also pictures or videos. On the other hand, some teachers just do not go the extra mile and stick to the textbook to finish the syllabus on time.

T3: *When it comes to SD, I like to do research so that I can deliver an informed lesson and not only link prior knowledge but also pass on new knowledge.*

Environment plays a significant role in making our existence on the planet possible. Everything we use to live a full life comes from the environment. Environmental pollution is affecting our lives physically, emotionally, socially, economically, and intellectually. It has become a major worldwide issue which cannot be solved by the effort of one. This is evident in the many litter projects that are put in place to control pollution. Hence, the biggest challenge lies in having these measures, but people not using them effectively. This may be due to a lack of understanding or resistance to change. Therefore, it is up to each individual to make an effort to save the planet.

4.4.3.5 The need for sustainable future envisions in teaching sustainable development

According to NEEP-GET (2005), the way educators teach influences learners' values and worldviews. This principle highlights the importance of the environment in the classroom, as well as the broader environment. In essence, environmental education seeks to enable broad structural and social change towards sustainability. This notion implies that environmental education should nurture a new ethic, requiring critical thought about the role, nature, and potential of environmental education as a transformative agent of personal, social and planetary change. The emerging implication is that educators need to explore the idea that how they teach is as important as what they teach. Environmental learning challenges educators to develop

learning processes that prepare learners to be active, responsible citizens who can make better lifestyle choices and challenge ways of working and thinking about the world. Naturally, teachers and learning communities are key components in the dissemination of those sustainability principles that will lead to the necessary changes in attitude.

T3: *I always tell learners that they are responsible for their classroom.*

This demands that learners begin to work together in class activities, and this may lead to a transformation of attitudes towards the environment. In support of this, Wilson and Shulman (1989) argue that teaching sustainability is a civic project. This entails that what learners are taught at school must be applicable to society at large. According to Sisely (2003), teachers can successfully engage learners in sustainable development initiatives. This can be done by helping learners to adapt to the strategies that they are trying to enforce by relating the strategies to their everyday lives and encouraging them to use the knowledge to change their attitudes and transform their current situations at school, at home, and in their societies.

Figure 4.3 showing three ways to engage learners in SD initiatives.

4.4.3.6 Promoting an integrated approach to using teaching strategies to promote sustainable development

The learning content and curriculum are relevant to the learners' context. They also provide knowledge, skills, and values which better prepare students to live and learn in a complex world and uncertain future (UNESCO, 2005). Although there exist initiatives in the region focused on supporting the development of teachers' competences in ESD, most of them tend to engage with teachers already interested in or committed to this agenda.

T1: *There is a teacher who practically deals with the environmental stuff, I just teach the content. I am more passionate about mathematics*.

The challenge is to engage the "disengaged", so that sustainability principles can be effectively mainstreamed in the school life and learning experience. Acknowledging the need to bring

contextual relevance and innovation into the school curriculum, many resource conservation evaluation systems (RCEs) are focused on engaging key stakeholders in primary and secondary school education to rethink teaching and learning, facilitating projects which support the student learning for sustainability, and providing training to pre-service and in-service teachers.

4.4.3.7 Integrating global sustainable development initiatives within the school

Most initiatives and projects studied have focused on reorienting the curriculum towards sustainability through providing capacity building for teachers, and engaging students in active learning activities. Change toward sustainability requires more than just rethinking educational curriculum. There are significant opportunities for schools to not only rethink what we learn but also how we learn it. To be successful, the transformation will require the involvement of all the school community, and rethinking school. This study has confirmed the key role of RCEs in brokering partnerships for change. There exist many examples that illustrate how RCEs have involved key national and local school stakeholders to develop and implement collaborative ESD undertakings in school settings. In order to increase the RCE impact and upscale ESD efforts, more attention should be given to inter-RCE collaborations. Networking partnerships among RCEs can be used to connect RCE members from different geographical contexts to share best practice and discuss regional challenges.

4.4.3.8 Developing ethical values for the schools

Environmental ethics is based on the notion that all life has intrinsic value. In this regard, stewardship as a word has a culture in philosophy, especially in ethics, where it is mainly applied to represent responsible use of resources (Mutussis & Sheehan, 2013). In essence, sustainability is a value-oriented concept as respect, responsibility and conservation are important attributes when equipping learners to conduct behaviour that is considered morally acceptable. Participant 2 stated that one of the values embedded in environmental learning is creating a better world for all. Therefore, personal values are closely linked to social and environmental values.

T3: *I teach in a value-oriented school where respect is in the schools' mission statement*. Learners are encouraged to respect not only themselves but their things, other people and the environment at large; hence, to understand that all living and non-living entities are dependent on each other for survival. In support of this view, Cambers (2008) argues that education for

sustainability must embody a commitment to values, principles, attitudes, and behaviours and, more specifically, to a clearly understood notion of justice and equity.

4.4.3.9 Challenges besetting the teaching of sustainable development

Teachers face many challenges, such as overcrowded classrooms and disruptive students and this has a significant impact on their lessons. For example, if a geography teacher plans to do an outside lesson with a large number of learners, it may be chaotic, and the objectives of the lesson will not be met.

> T3: *I am limited to only teach using whole-class discussion as I am more in control of the lesson. Group work is very chaotic for me.*

When we examine successful national education campaigns, we find they often have simple messages. For example, messages that encourage us to vaccinate our children, or discourage us from driving drunk and taking drugs, are simple concepts compared to the complex range of environmental, economic, and social issues that sustainable development encompasses. This is because sustainability is a value-oriented concept. For example, litter bins are all over campus, but students still choose to throw litter on the floor and/or in an inappropriate area. There is a huge gap between the content being taught and practice. People must undertake to balance the generation of wealth with continuously enhanced environmental quality and social well-being. The response to the challenges of sustainable development thus requires that we rethink our academic institutions and how teachers teach the concept of sustainable development.

4.5 Conclusion

To sum up, this section discussed the findings from the research. The findings illustrated the themes of the response to the hypothesis that was posted earlier to guide the research findings. This was done by examining the observation sheets, the recordings of the interviews, and the results of reflection. The major findings revealed that teachers use a variety of strategies to unpack sustainable development. However, there are numerous challenges such as overcrowding, lack of resources and the geographical location of the schools which have a formidable impact on the implementation of the desired and appropriate teaching strategy. In the researcher's opinion, teachers should work together and empower each other. In that way, they can overcome the challenges that they face when teaching in impossible situations.

CHAPTER FIVE

LIMITATIONS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The main objective of this research report was to explore the teaching strategies that geography teachers use to teach sustainable development in Pinetown District. This chapter will summarise the main findings from this research report. The objectives of this study were as outlined in Chapter one: to explore the different strategies that teachers use to teach sustainable development, to understand how teachers use the teaching strategies to teach sustainable development, and to understand why teachers use the teaching strategies to teach sustainable development. Thereafter, this chapter states the limitations, suitable recommendations and aspects for further research. This section is critical to reflect on the findings from the study. Thereafter, I will draw the conclusions of the study.

5.2 Summary of research findings

5.2.1 Teaching strategies that are used to teach sustainable development

Whole class discussion

Findings from the data analysis indicate that whole class discussion is the most implementable strategy because many teachers face the challenge of overcrowding, and some strategies are easy to maintain because with overcrowding there is also a discipline issue. Whole class discussion encourages learners to share ideas holistically.

Roleplay

According to Semali (1999), drama allows authentic voices to be heard through a role. When using drama as a teaching methodology, an educator must ensure that all learners have their roles to play. This will allow the opportunity for their true voices to be listened to. In addition, different ideas about sustainability measures can be shared and realized through a role-play scenario.

Group work

Participants felt that students do not become environmental agents without suitable training in schools. It is a continuum of proficiency which begins with discussions, continues with

environmental awareness initiatives, and ends with action where people engage in environmental awareness programmes in schools and communities. Therefore, group work is essential in this regard. Results revealed that groupwork helps learners to develop and share ideas.

Field trips

Fieldwork as a pedagogical method has been shown to benefit students' cognitive skills and motor coordination, facilitate interest, enhance knowledge acquisition and understanding by situating learning in context and providing opportunities to transfer and apply prior knowledge. Learners get exposed to real-life situations and are encouraged to think of ways that they can reduce environmental degradation. Results revealed that field trips are not common any longer because many learners cannot afford to go on excursions, and the responsibility for the learners is on the teacher should anything happen to them while away.

Using ICT

ICT can help teachers to present sustainability content in ways most suited to individual and personal needs. This promotes inclusivity, which requires that teachers develop and design our schools, classrooms, programmes, and activities so that all students learn and participate to reach their full potential. Results revealed that most educators cannot use ICT properly to enhance the sustainability lesson. access to computers in schools is limited, which makes it difficult for the teachers to deliver the planned lesson as desired.

5.2.2 The need for teaching sustainable development in schools

Practising sustainable development is our only chance to save the earth. There is a great need to teach sustainable development so that learners can practice what they are taught in the school, at home and in their communities at large. Results revealed that educators' understanding of the concept of sustainable development is pivotal in understanding how effective their teaching would be. The results revealed that most participants do not over-emphasize the practicability of sustainable development. Teaching towards sustainable development is a global goal because its problems and solutions are importantly situated in local communities. In essence, sustainable development requires active and knowledgeable citizens and caring and informed decision makers capable of making the right choices about the complex and interrelated economic, social and environmental issues human society is facing. This affirms that sustainable development is not only taught or reinforced in geography curriculum, but it is also found in other subjects.

5.2.3 Integrating global initiatives within the school and involving environmental organizations

There are numerous global environmental/sustainability initiatives to save the earth that are currently running worldwide The findings suggest that involving local environmental organizations such as WESSA can help learners to be better informed about the importance of preserving the environment, as class lessons are not enough. More exposure to the environment through guest speakers and environmental shows can have a wider impact on learners and their attitudes towards the environment. Generally, participants felt that time should be allocated for such things so that specific attention can be given to facilitate sustainable development initiatives. The local municipality and Education Department attempt to organise workshops for teachers to empower them on matters related to sustainability at the local and regional level, to the advantage of learners.

5.2.4 Integrate recycling, reusing and reducing in the social science and science curricula

The go-green campaign is based on the notion that people should reconsider before replacing and rethink before buying. The triple R campaign is there to help people save money, and the earth, by not buying unnecessary items. Recycling, reusing and reducing has many benefits, as outlined by the participants. Findings revealed that many schools engage in recycling initiatives, but learners do not understand the aim of disposing of litter in different bins, so they throw it anywhere. There are many local companies who buy plastic bottles, glass bottles and cardboard, and scrap paper produced by the schools, businesses and the community. This motivates the less privileged schools to make extra money to improve their facilities. On the other hand, the go-green campaigns are not integrated into the curriculum, hence they are done in isolation, independently. That is why most educators felt it is not their responsibility to facilitate the go-green initiatives.

5.2.5 Challenges besetting the teaching of sustainable development

Results revealed that there are many challenges that affect the correct way of teaching sustainable development, such as overcrowded classrooms and disruptive students. This has a significant impact on lessons. Furthermore, educators' understanding of the concept of sustainable development is pivotal in understanding how effective their teaching will be. The results revealed that most participants do not exaggerate the practicability of sustainable

development. This is due to the time constraints of the curriculum and also the means to facilitate such campaigns.

5.3 Limitations of the study

As with any extended work of research, a few limitations were identified in this study. These limitations do not diminish the study's significance, but rather serve as parameters for further studies to be undertaken on the same topic. They include shortcomings in generalizability, the period of data collection, and issues of validity and reliability. The following limitations of this study were identified:

- The size of the sample was relatively small as there were only three participants. A bigger sample would enhance the reliability of the research as there would be more data to analyse and detect patterns in.
- The study is gender-biased - the three educators were all female. This was because the sample was chosen purposively for convenience, as the researcher targeted educators that she knew.
- The geographical location of the school the educators teach at, a multiracial school in the Pinetown district, was urban. Hence having participants from rural schools would have enhanced the research as comparisons would have allowed the researcher to better understand the teaching strategies that geography teachers use in different locations. This limits the researcher's ability to generalize about Pinetown district schools.
- The targets of the study were geography teachers, whereas all teachers in the school environment can instill the need in learners to take responsibility for preserving the environment.

5.4 Recommendations

- Based on the findings from this study, it is pivotal for environmental education to be integrated into the school curriculum. This will give learners the time and opportunity to focus on environmental issues within the school environment. Children's ideas should be considered in the teaching-learning process because they have indigenous knowledge that they have experienced or gained from the discourse on their environment or culture.
- Successful sustainable development initiatives require the involvement of all stakeholders concerned such as teachers, learners, community members, local municipalities, the Department of Environmental Affairs and environmental organisations. However, in

developing the school curriculum, teachers, school managers, and curriculum implementers should work on an informative environmental awareness curriculum that will lead to a change of attitudes and behaviours towards the environment, thus initiating action.

- To support sustainability initiatives in schools which are initiated through WESSA, teachers need to get learners involved and encourage them to be agents of change and to take responsibility for the environment through engaging in projects that will save the earth.
- We cannot neglect the community at large, so parents should also be educated through community meetings because learners learn a lot from home and from parents. If parents change their attitudes towards sustainability, learners can easily reinforce what they learn at school, at home, and in society.
- Learners should be encouraged to appreciate nature and engage more in sustainable activities such as having a garden at school.
- Teachers need to pay careful attention to the quality of their sustainability subject content and should practice what they teach. Learners will not put litter in the bin if they see the teacher littering the floor.
- Designated waste bins within the school should be used to encourage recycling and funds for the school.
- The effectiveness of education for sustainable development must ultimately be measured by the degree to which it changes the attitudes and behaviours of people, both in their individual roles and in carrying out their collective responsibilities and duties as citizens.

5.5 Aspects of further research

This study has focused on the teaching strategies that teachers use to teach sustainable development. However, further research is needed to go deeper into children's knowledge and understanding of sustainable development. This will give more insight if the teaching strategies that teachers use are effective.

Not all role players were involved in the research process. Family members, community members, subject specialists, and municipalities could be consulted to achieve a deeper understanding of the impact of the teaching strategies. This would make the study more reliable, as sustainable development is not only learned at school. A holistic involvement of stakeholders other than teachers can have a greater impact globally. They could be given opportunities to share their experiences and opinions about environmental education.

This study was conducted in an urban area. Conducting a study in different areas – rural, township and urban – could result in its being more reliable as comparisons could be drawn between them. Other data collection methods such as case studies and questionnaires could be adapted to give greater scope for analysis.

5.6 Conclusion

The primary concern in this study has been the exploration of the teaching strategies that are used by geography teachers to teach sustainable development. The study has engaged with literature, and data collection was done through interviews and classroom observations. The research builds on and seeks to contribute to the understanding of the teaching strategies that geography teachers use to teach sustainable development and the importance of integrating practicals into the geography curriculum.

Teachers' experiences and observations were recorded during interview sessions to better understand their motives for using the teaching strategies that they use to teach sustainable development. This was done to fulfill the objectives of the study, which are:

1. To explore the different strategies that teachers use to teach sustainable development.
2. To understand how teachers use teaching strategies to teach sustainable development.
3. To understand why teachers use teaching strategies to teach sustainable development.

Teaching is a learning journey for all. No teacher is perfect, and everyone has room for improvement. Evaluation is the means by which we try to identify which aspects of our teaching is good and which need to be changed. It is important to develop teaching strategies that will ensure that all types of learners are able to understand the content taught and apply it. Although some teachers experience challenges such as the geographical location of the schools, disruptive learners and overcrowded classrooms, the researcher believes that there is hope for change. A good teacher works against odds. "Teachers must plan proactively for deliberate change, but also respond appropriately to unexpected change" (Wison & Shulman, 1987, p. 87). Good teaching that is engaging, relevant, multicultural, and appealing to a variety of modalities and learning styles works well with all children from different backgrounds.

REFERENCES

Abbot, A. (2001). *Chaos of disciplines.* Chicago: University of Chicago Press.

Adriansen, H., & Madsen, L (2016). Facilitation: A novel way to improve student well-being. *Innovative Higher Education, 38*(4), 295-308.

Alexander, R. J. (2014). Triumphs and dilemmas of dialogue. In A. Lefstein & J. Snell, *Better than best practice: Developing teaching and learning through dialogue.* New York**:** Routledge.

Angioni, G. (2003). Indigenous knowledge: Subordination and localism. In G. Sanga & G. Ortalli (Eds.), *Nature, knowledge, ethnoscience, cognition, and utility* (pp. 287-296). New York: Oxford University Press.

Behrendt, L. (2003). *Achieving Social Justice: Indigenous Rights and Australian Future*. Annandale NSW: The Federation Press.

Bertlett, S. (2008). *Climate change and urban children*. London: SAGE.

Bertram, C., & Christiansen, I. (2016). *Understanding research: An introduction to reading research.* Pretoria: Van Schaik.

Boden, M. A., & Edmonds, E. A. (2009). What is generative art? *Digital Creativity, 20*(1), 21-46.

Borg, C., Gericke, N., Hoglund, H & Bergman, E. (2012). The barriers encountered by teachers implementing education for sustainable development: Discipline-bound differences and teaching traditions. *Research in Science & Technological Education*, *30*(2), 185-207.

Boyle, R., & Biklen, S. (2007). *Research for education: An introduction to theories and methods*. New York: Pearson.

Bruntland Report. (1987), *Our common future*. Oxford: Oxford University Press.

Bryman, A., & Bell, E. (2007). *Business research methods.* New York: Oxford University Press.

Biedenweg, K., Monroe, M. C., & Oxarart, A. (2013). The importance of teaching ethics of sustainability. *International Journal of Sustainability in Higher Education, 14*(1), 6-14.

Calucci, G. (2006). *From scientific literacy to sustainability literacy: An ecological framework for education*. New York: Wiley.

Cambers, G. (2008). *Climate change impacts on coastal and marine biodiversity in the insular Caribbean*. Report of Working Group II, Canari technical report no. 382.

Capra, F. (2007) Sustainable Living, Ecological Literacy and the breath of Life. *Canadian Journal of Environmental Education,* 12(1): 9-19.

Casey, D., & Murphy, K. (2013). Students' experiences of implementing clinical skills in the real world. *Journal of Clinical Nursing, 7* (3), 181- 183.

Chilesa, B., Mafela, L., & Preece, J. (2003). (Eds.). *Educational research for sustainable development*. Gabarone: Lightbox.

Christie, I., & Warburton, D. (2001). *From here to sustainability*. London: Earthscan.

Christie, P. (2001). Improving school quality in South Africa: A study of schools that have succeeded against the odds. *Journal of Education, 26,* 40-65.

Christie, P. (2008). *Opening the doors of learning. Johannesburg:* Heinemann.

Clugstone, R., & Ralder, W. (2009). *Critical dimensions of sustainability in higher education.* New York: Peter Lang.

Cope, D. G. (2014). *Methods and meanings: Credibility and trustworthiness of qualitative research.* Paper presented at the Oncology Nursing Forum, Florida, 1 January 2014.

Creswell, J. W. (2014). *A concise introduction to mixed methods research*. London: SAGE.

Creswell, J. (2013). *Qualitative inquiry & research design: Choosing among five approaches* (3rd ed.). Thousand Oaks, CA: Sage Publications, Inc.

Creswell, J. W., & Miller, D. L. (2000). Determining validity in qualitative inquiry. *Theory into Practice,39*(3), 124-130.

Daly, H., & Cobb, C. (1989). *Redirecting the economy toward community, the environment, and a sustainable future.* New York: Beacon Press.

Davis, N. (2010). CINZS goes into virtual schooling. *Computers in New Zealand Schools: Learning, Teaching, Technology, 22*(2), 11- 32.

Dei, S. G. J. (2002). *African development: The relevance and implications of indigenousness*. Toronto: University of Toronto Press.

Dei, S. G. J., Hall, B.L, & Rosenburg, D. G. (2002). *Indigenous knowledges in global contexts: Multiple readings of our world*. Toronto: University of Toronto Press.

Denison, M. (2018). WESSA school program. A guidline for practitioners /www.wessa.org.za

Denscombe, M. (2014). *The good research guide: For small-scale social research projects* New York: McGraw Hill Education.

Dewey, J. (2007). *Experience and education*. New York: Simon & Schuster.

DFES. (2006). www.teachernet.gov.uk/publications

Diesendorf, M. (2000). Sustainability and sustainable development. *Sustainability: The corporate challenge of the 21st century, 2*, 19-37.

Diesendorf, M. (2007). *The challenges for the corporate sustainability in 21st century*. Sydney: Allen & Unwin.

Domegan, C., & Fleming, D. (2007). *Marketing research in Ireland* (3rd ed.). Dublin: Gill MacMillan.

Duarte, B; Fonseca, L; Portela, A; Queirós, J. & Paiva, L. (2018), "Mapping higher education for sustainable development in Portugal", Management & Marketing. *Challenges for the Knowledge Society*: Vol., 13 (3), pp. 1064-1075.

Du Preez, P., & Roux, C. (2008). Participative intervention research: The development of professional programmes for in-service teachers. *Education as Change, 12*(2), 77-90.

Easterby-Smith, M., Thorpe, R., & Lowe, A. (2002). *Management research: An introduction.* (2nd ed.). London: SAGE.

Elliot, A. (Ed.). (2008). *Handbook of approach and avoidance motivation*. New York: Taylor & Francis Group.

Emas, R. (2015). The concept of sustainable development: Definition and defining principles. Introduction to *Successes and shortcomings in the implementation of national sustainable development strategies: From the greening of governance to the governance of greening.* PhD dissertation, Florida International University, Miami, pp. 1-3.

ESRI. (2008) What is GIS? http://www.gis.com/whatisgis/

Fien, J., & Tilbury, D. (2002). The global challenge of sustainability. In D. Tilbury, R. Stevenson, J. Fien, & D. Schreuder (Eds.), *Education and sustainability: Responding to the global challenge* (103-213). Cambridge: IUCN.

Fuertes-Camacho, M.; Graell-Martin, M; Fuentes- loss, M; Balaguer- Fabregas, C. (2019). Integrating Sustainability into Higher Education Curricula through the Project Method, a Global Learning Strategy. *Journal of Sustainability* **:***11*(3), 767.

Fossey, E., Harvey, C., McDermott, F., & Davidson, L. (2002). Understanding and evaluating qualitative research. *Australian and New Zealand Journal of Psychiatry, 36*(6), 717-732.

Fullan, M. (2006). The future of educational change: System thinkers in action. *Journal of Educational Change*, *7*(3), 113-122.

Fuller, R. A., Irvine, K. N., Devine-Wright, P., Warren, P. H., & Gaston, K. J. (2007). Psychological benefits of greenspace increase with biodiversity. *Biol. Lett. 3,* 390-394.

Gans, H. (2016). For an empirical sociology of the future. *Social Science Journal*. *33*(1), 97-103.

Gibson, I. F. (1994). *Studying curriculum*. New York: Biddles.

Gibson, R. (2005). *Principles of nutritional assessment* (2nd ed.). New Zealand: Dunedin.

Girardet, H. (1999). *Creating sustainable cities*. Totnes, Devon: Green Books for the Schumacher Society.

Gingging, F. (2013). *Being kadazandusun in Sabah.* Australia: The Australian National University Press.

Golafshani, N. (2003). Understanding reliability and validity in qualitative research. *The Qualitative Report*, *8*(4), 597-606.

Goode, W. (1982). *The family*. New Jersey: Prentice-Hall.

Goralnik, L, & Nelson, M. (2011). *Framing a philosophy of environmental action*. Michigan: Aldo.

Gore, J., Ladwig, J., Wendy, E., & Hywel, E. (2003). Quality teaching in NSW public schools. *Quality Teaching in NSW Public Schools*, (May), 1-16.

Gorissen, P., Van Bruggen, J., & Jochems, W. (2013). Methodological triangulation of the students' use of recorded lectures. *International Journal of Learning Technology, 8*(1), 20-40.

Groessler, A. (2017). Where's the transformation? Unlocking the potential of technology-enhanced assessment. *Teaching and Learning Inquiry*, 5(1),1-13.

Gunder, M. (2006). *Sustainability: Planning's saving grace or road to perdition?*London: SAGE.

Guba, E. G., & Lincoln, Y. S. (1981). *Effective evaluation*. San Francicso, Carlifornia: Jossey-Bass.

Gyekye, K. (1997). *Tradition and modernity in Africa*. New York: Oxford University Press.

Hargreaves, D. (2010). *Creating a self-improving school system*. Nottingham: National College for Leadership of Schools and Children's Services.

Hargreaves, S. (2007). *Study skills for dyslexic students*. London: SAGE.

Hawken, P., Lovins, A., & Lovins, L. H. (1999). *Natural capitalism: Creating the next industrial revolution.* Boston, Massachusetts: Little, Brown.

Herrick, C. (2010). Lost in the field: Ensuring student learning in the 'threatened' geography fieldtrip.

Hope, M. (2009). The importance of direct experience: A philosophical defense of fieldwork in Human Geography. *Journal of Geography in Higher Education*, *33*(2), 169-182.

Hughes, J., & Sharrock, W. (1997). *The philosophy of social research* (3rd ed.). Longman Social Research Series. New York: Routledge.

Hydon, P. (2014). *Difference equations by differential equation methods*. Cambridge: Cambridge University Press.

Jordan, M., & Klein, E. (2010). Environmental education in action: How expeditionary learning schools support classroom teachers in tackling issues of sustainability. *Teacher Education Quarterly*. *37*(4), 119-137.

Killen, R. (2000). *Outcomes-based education: Principles and possibilities*. Unpublished manuscript. University of Newcastle, Faculty of Education.

Killen, R. (2010). *Teaching strategies for quality teaching and learning.* Cape Town: Juta.

King, H. (2006). Understanding spatial literacy: Cognitive and curriculum perspectives. *Planet, 17*(1), 26-28.

Kolb, D. A. (1984). *Experiential learning: Experience as the source of land development* (Vol. 1). Englewood Cliffs, New Jersey: Prentice-Hall.

Korobar, V., & Siljanoska, J. (2016). Challenges of teaching sustainable urbanism. *Energy and Buildings, 115*, 121-130.

Korten, D. C. (1996). Civic engagement in creating future cities. *Environment and Urbanization, 8*(1), 35-49.

Krefting, L. (1991). Rigor in qualitative research: The assessment of trustworthiness. *The American Journal of Occupational Therapy, 45*(3), 214- 222.

Krauss, S. E. (2005). Research paradigms and meaning making: A primer. *The qualitative Report, 10*(4), 758-770.

Latour, B. (2004). Whose cosmos, which cosmo politics? Comments on the peace terms of Ulrich Beck. *Common Knowledge, 10*(3), 450-62.

Lawler, G., & Sillitoe, R. (2010). The challenge of finding new mineral resources: Global metallogeny, innovative exploration, and new discoveries. *Society of Economic Geologists Special Publication, 15*, 253-269.

Leininger, M. (1985). Nature, rationale and importance of qualitative research methods in nursing. In M. Leininger (Ed.), *Qualitative research methods in nursing* (pp. 1-28). New York: Grune & Straton.

Leopold, A. (2011). In John Muir and the importance of community, *The Journal of Environmental Education*, *42*(3), 181-192.

Lichtman, M. (2006). *Qualitative research in education: A user's guide*. London: SAGE.

Liu, G., Wang, X., Yang, Q., & Wei, M. (2007). Advances in studies on chemical constituents and pharmacological actions of cordyceps sinensis. *Food Science and Technology*, *32,* 202-209.

Lorr, M. (2012). Defining urban sustainability in the context of North American cities. New York: Berghahn.

Louv, R. (2005). *Last child in the woods: Saving our children from nature deficit disorder.* Chapel Hill, NC: Algonquin Books.

Mackey, A., & Gass, S. M. (2015). *Second language research: Methodology and design*. New York: Routledge.

Maniates, M. 2013. Editing out unsustainable behavior. In J, Meyers**,** *State of the world 2010: Transforming cultures: From consumerism to sustainability.* (pp. 119-126). New York: Norto

Mackenzie, K., & Edwards, M. (2013). Challenges faced by schools when introducing ICT in developing countries. *International Journal of Humanities and Social Science Invention*, *2*(9), 1-4.

McKool, S. S., & Gespass, S. (2009). Does Johnny's reading teacher love to read? How teachers' personal reading habits affect instructional practices. *Literacy Research and Instruction*. *48*(3), 264-276.

McMillan, J., & Schumacher, S. (2006). *Research in education*: *Evidence-based inquiry* (6th ed.). Boston, MA: Allyn and Bacon.

Meadows, D. (1990). Harvesting our Hundredfold. Kenya, UNEP.

Mezirow, J. (2000). *Learning as transformation: Critical perspectives on a theory in progress.* San Francisco, CA: Jossey-Bass.

Methods and Processes To Support Change-Oriented Learning. Towards better environmental sustainability practices. (2008). C.A.P.E. Conservation Education Programme, Rhodes University Environmental Education & Sustainability Unit, Grahamstown.

Miller, Y. (2005). https://doi.org/10.1002/0470013192.bsa202

Mitchell, P. (2014). *Global education for collaborative practice*. Washington DC, .

Morgan, N., & Saxton, J. (1987). *Teaching drama: A mind of many wonders*. Cheltenham: Stanley Thornes.

Morrow, L. (2007). *Best practices in literature instruction* (3rd ed.). New York: Guilford Press.

Mortimore, P. (1999). Pedagogy: What do we know? In P. Mortimore (Ed.), *Understanding pedagogy and its impact on learning* (1- 19). London: Paul Chapman/ SAGE.

Moreton, G., & Robinson, N . (2007). *Knowing differently: The challenge of the indigenous.* New York: *Routledge.*

Moss, P., & Petrie, P. (2002). *From children's services to children's space. Public policy, children and childhood.* New York: Routledge Falmer.

Mouton, J., & Marais, H. C. (1996). *Basic concepts in the methodology of the social sciences* (rev. ed.). Pretoria: HSRC.

Muir, J. (1901). *Our national parks*. Boston, MA: Houghton Mifflin.

.

Mungazi, D. A. (1996). Africa, Asia, and Latin America. *The ANNALS of the American Academy of Political and Social Science, 546*(1), 162-163.

Myers, M. D., & Newman, M. (2007). The qualitative interview in IS research: Examining the craft. *Information and Organization, 17*(1), 2-26.

Mwenda, N. (2003) The challenges of education and development in post-colonial Kenya. *Africa Development, 28,* 3-4.

Nairn, K. (2005). The problems of utilizing 'direct experience' in geography education. *Journal of Geography in Higher Education, 29*(2), 293-309.

National Environmental Education Project for General Education and Training (NEEP-GET), 2005.

Ndlovu, N. (2012). *The quality use in SA classrooms: Strategies to overcome poverty and inequality*. Johannesburg: University of the Witwatersrand.

NEEP-GET, (2005). *Stories of change L, P. Action research case studies*. Howick, New Zealand: NEEP-GET/ShareNet.

Ntuli, P. P. (2002). Indigenous knowledge systems and the African Renaissance. In C. A. Odora Hoppers (Ed.), *Indigenous knowledge and the integration of knowledge systems* (pp. 53-67). Cape Town: New Africa Books.

O'Byrne, D., Dripps, W., & Nicholas, K. A. (2015). Teaching and learning sustainability: An assessment of the curriculum content and structure of sustainability degree programs in higher education. *Sustainability Science, 10*(1), 43-59.

Owuor, S. O. (2007). Migrants, urban poverty and the changing nature of urban-rural linkages in Kenya. *Development Southern Africa, 24*(1), 109-122.

Parliamentary Commission for the Environment. (2004).

Pawson, E., & Dovers, S. (2003). Environmental history and the challenges of interdisciplinarity. *An Antipodean Perspective in Environment and History*. *9*(1), 53-75.

Pearce, B. (1989). http://www.environmentandsociety.org/node/5454

Perry, R. (2008). *Perry's chemical engineering handbook* (8th ed.). New York: McGraw-Hill.

Piaget, J. (1977). *Epistemology and psychology of functions*. Dordrecht, Netherlands: D. Reidel.

Pratt, D. (1994). *Curriculum planning: A handbook for professionals*. Florida: Harcourt. Brace College Publishers.

Purcell, T. (*1998*). Indigenous knowledge and applied anthropology: Questions of definition and direction. *Human Organization*, Fall *57*(3), 258-270.

Reed, M. (2010). What is social learning? *Ecology and Society*,*19*(4), 54.

Robinson, L, & Vaealiki, S. (2010). Ethics and pedagogy at the heart of early childhood education for sustainability. In J. Davis, *Young children and the environment: Early education for sustainability* (103- 123). Cambridge: Cambridge University Press.

Rolfe, G. (2006). Validity, trustworthiness and rigour: Quality and the idea of qualitative research. *Journal of Advanced Nursing, 53*(3), 304-310.

Roodman, D. (1996). *Paying the piper: Subsidies, politics and the environment*. Washington, DC: Institute for international economics.

Roos, J. (2017). Practical wisdom: Making and teaching the governance case for sustainability. *Journal of Cleaner Production, 140,* 117-124.

Rordan, M., & Klein, E. (2010). Environmental education in action: How expeditionary learning schools Support classroom teachers in tackling issues of sustainability. *Teacher Education Quarterly*, *37*(4), 119-137.

Rose, P. (1992). *The strategy of preventive medicine*. New York: Oxford University Press.

Rosenburg, S. (2009). Cultural competence with woman (4th ed.). Boston: Cengage Learning.

Russon, P., & Sisitka, W. (2003). The emergence of sustainable industries: Building on natural capital. *Strategic Management Journal*, *24*, 317-33.

Sauer, C. O. (2005). The education of a geographer. *Annals of the Association of American Geographers, 46*(3), 287-99. doi:10.1111/j.1467-8306.1956.tb01510.x

Seale, C. (1999). *The quality of qualitative research*. London: SAGE.

Semali, L. (1999). Community as Classroom: Dilemmas of Valuing African Indigenous Literacy in Education. *International Review of Education*, 45 (3-4): 305-319.

Shava, S. (2003). Environmental Education Policy Development in Zimbabwe: An educational experience, *Southern African Journal of Environmental Education*, 20, pp.128–134.

Shulman, L. (1986). Those who understand: Knowledge growth in teaching. *Educational Researcher*, *15*, 4-14.

Shurmer-Smith, P. (2002). *Doing cultural geography*. London: SAGE.

Sillitoe, P. (1998). The development of indigenous knowledge: A new applied anthropology. *Current Anthropology*, *39*(2), 223-235.

Sinclair, M. (2007). A guide to understanding theoretical and conceptual frameworks. *Evidence-Based Midwifery, 5*(2), 39.

Smith, R. (2010). Social work, risk, power. *Sociological Research Online*, *15*(1), 1-10.

South Africa, Deparment of Basic Education. (2011). *Curriculum and Assessment Policy Statement (CAPS) Grades 10-12 (General): Geography*. Pretoria: Government Printer.

South Africa, Department of Education. (1998). *Environmental Impact Statement Summary* Pretoria: Government Printer.

South Africa, Department of Education. (2002). *Revised National Curriculum Statement Grades R-9 (Schools).* Pretoria: Government Printer.

Stoddart, H. (Ed.). (2011). A pocket guide to sustainable development governance. *The National Journal, 26*(27), 1571. https://mafiadoc.com/stoddart-2011-pocket-guide-stakeholder-forum_5b843fa5097c47007c8b4581.html

Stone, P. (2007). The rhetoric and reality of "opting out." *Contexts*, *6*(4), 14-19.

Stone, M., & Barlow, Z. (2009). *Smart by nature: Schooling for sustainability.* Washington, DC: SAGE.

Summers, M. (2004). Teaching sustainable development in primary schools: An empirical study of issues for teachers. *Environmental Education*, *9*, 327.

Summers, M., Corney, G., & Childs, A. (2004). Student teachers' conceptions of sustainable development: The starting points of geographers and scientists. *Educational Research, 46,*163-182.

Suresh, Y., & Rath, S. K. (2014). A genetic algorithm-based approach for test data generation in basis path testing. eprint asXiv:1401-5165. January. doi:10.7321/jscse.v3.n3.49

Susan Strife. (2010): Reflecting on Environmental Education: Where Is Our Place in the Green Movement?, *The Journal of Environmental Education*, 41:3, 179-191

Thrash, T., & Elliot, A. (2003). Inspiration as a psychological construct. *Journal of Personality and Social Psychology, 84*(4), 871-889.

Tobin, G., & Bergley, B. (2014). Methods and meanings: Credibility and trustworthiness of qualitative research. *Oncology Nursing Forum, 41*(1).

Turay, T. M. (2002). Peace, research and African development: An indigenous African perspective. In G.J.S. Dei, B.L. Hall & D.G. Rosenberg (Ed), Indigenous knowledges in global contexts: Multiple readings of our world (pp. 248-263). Toronto: University of Toronto Press.

Uitto, A., & Solaranta, S. (2016). Contribution of secondary school subject teachers on the education for sustainable development. *Part 8: Environmental, Health and Informal-Outdoor Science Education.* European Science Education Research Association (ESERA) ebook-esera2011_UITTO-08.pdf, pp. 1-6.

UNESCO. (2005). *Teaching and learning for a sustainable future. A multimedia teacher education programme.* Abingdon-on-Thames: Taylor & Francis.

United Nations General Assembly. (1987).

Van Driel, J., Bulte, A., & Verloop, N. (2007). The relationship between teacher's general beliefs about teaching, learning and their domain-specific curricular beliefs. *Learning and Instruction, volume* (issue). 156-171.

Van Wyk, W. (2006). *Optimal design methodology for LLC resonant converter*. Dallas, IEEE.

Vygotsky, L. S. (1978). *Mind in society*. The development of higher psychological processes. London: Harvard University Press.

Wagner, A. (2009). Mobilization of steryl esters from lipid particles of the yeast saccharomyces cerevisiae. *Biochemistry Biophysics, 91*(2), 118-24.

Wakefield, J. (2003). Teaching sustainability. *Environmental Heal Perspectives,* 23**(**2), 81- 92

Wals, E. (2007). *Globalization and environmental education: Looking beyond sustainable development*. United Kingdom: Routledge.

Wane, N. (2002). African women and spirituality: Connection between thought and education. In E. O'Sullivan, A. Morrell, & M. O'Connor (Eds.), *Expanding the boundaries of transformative learning: Essays on theory and practice* (pp. 135-150). New York: Palgrave St. Martin's Press.

Wangoola, P. (2002). Mpambo, the African multiversity: A philosophy to rekindle the African spirit. In G. J. S. Dei, B. L. Hall, & D. G. Rosenburg (Eds.), *Indigenous knowledge in global contexts: Multiple readings of our world.* Toronto: University of Toronto Press.

Watts, M., & Becker, W. (2008). *Teaching tools, teaching methods in undergraduate's economics*. New Jersey: Blackwell.

Williams, J. (2002). *Mindfulness and the prevention of depression: A guide to the theory and practice of mindfulness-based cognitive therapy*. New York: Guilford Press.

Wilson, S., & Shulman, L. (1987). *150 different ways of knowing: Representations of knowledge in teaching: Exploring teachers' thinking*. London: Cassel.

Wilson, S., & Shulman, L. (1989). Teachers of substance: Subject matter knowledge for teaching. In M. C. Reynolds (Ed.), *Knowledge base for the beginning teacher,* (pp. 23-46). Oxford: Pergamon.

Yanow, D. (1998). Space stories: Studying museum buildings as organizational spaces while reflecting on interpretive methods and their narration. *Journal of Management Inquiry*, *7*(3), 215-239

Yin, R. (2003). *Case study research: Design and methodology*. London: SAGE.

APPENDIX A: Permission letter from DBE to conduct a study

education

Department:
Education
PROVINCE OF KWAZULU-NATA

Enquiries: Phindile Duma Tel: 033 392 1063 Ref.:2/4/8/1679

Miss BT Mkhize
PO Box 18017
Gamalakhe
4249

Dear Miss Mkhize

PERMISSION TO CONDUCT RESEARCH IN THE KZN DOE INSTITUTIONS

Your application to conduct research entitled: "TEACHING STRATEGIES USED BY GEOGRAPHY TEACHERS TO TEACH SUSTAINABLE DEVELOPMENT IN PINETOWN DISTRICT", in the KwaZulu-Natal Department of Education Institutions has been approved. The conditions of the approval are as follows:

1 .The researcher will make all the arrangements concerning the research and interviews.

2. The researcher must ensure that Educator and learning programmes are not interrupted.
3. Interviews are not conducted during the time of writing examinations in schools.
4. Learners, Educators, Schools and Institutions are not identifiable in any way from the results of the research.
5. A copy of this letter is submitted to District Managers, Principals and Heads of Institutions where the Intended research and interviews are to be conducted.
6. The period of investigation is limited to the period from 20 November 2018 to 01 May 2021.

7. Your research and interviews will be limited to the schools you have proposed and approved by the Head of Department. Please note that Principals, Educators, Departmental Officials and Learners are under no obligation to participate or assist you in your investigation.

8. Should you wish to extend the period of your survey at the school(s), please contact Miss Phindile Duma at the contact numbers below.

9. Upon completion of the research, a brief summary of the findings, recommendations or a full report/dissertation/thesis must be submitted to the research office of the Department. Please address it to The Office of the HOD, Private Bag)(9137, Pietermaritzburg, 3200.

10. Please note that your research and interviews will be limited to schools and institutions in KwaZulu-Natal Department of Education.

Dr. EV Nzama
Head of Department: Education
Date: 23/11/2018

KWAZULU-NATAL DEPARTMENT OF EDUCATION...Championing Quality Education • Creaing and Securing a Brighter Futire

Postal Address: Private Bag • Pietermaritzburg • 3200 • Republic of South Africa

Physical Address: 247 Burger Street • Anton Lembede Building • Pietermaritzburg • 3201

Tel.: +27 33 392 1063 • Fax.: +27 033 392 1203• Email:Phindile.Duma@kzndoe.gov.za •Web:www.kzneducation.gov.za

Facebook: KZNDOE.. Twitter: @DBE_KZN....lnstagram: kzn_education....youtube:kzndoe

APPENDIX B: Ethical clearance from UKZN to conduct a study

UNIVERSITY OF KWAZULU-NAT
INYUVESI YAKWAZULU-NA

12 October 2018

Ms Busisiwe Temperence Mkhize 209514248
School of Education
Edgewood Campus

Dear Ms Mkhize

Protocol Reference Number : HSS/1148/018M
Project titte: Teaching strategies used by Geography teachers to teach Sustainable Development in Pinetown District

Full Approval — Expedited

Application In response to your application received 6 August 2018, the Humanities & Social Sciences Research Ethics Committee has considered the abovementioned application and the protocol has been granted FULL APPROVAL.

Any alteration/s to the approved research protocol i.e. Questionnaire/lnterview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment /modification prior to its implementation. In case you have further queries, please quote the above reference number.

PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.

The ethical clearance certificate is only valid for a period of 3 years from the date of issue. Thereafter Recertification must be applied for on an annual basis.

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully

.....

Dr Rosemary Sibanda (Deputy Chair)

Humanmities & Social Sciences Research Ethics Committee/pm

Cc Supervisor: Dr Dumani Mncube cc Academic Leader Research: Dr SB Khoza cc School Administrators: Ms Sheryl Jeenarain

---

Humanities & Social Sciences Research Ethics Committee

Dr Shenuka Singh (Chair)

Westville Campus, Govan Mbeki Building

Postal Address: Private Bag Durban 4000

Telephone: +27 (0) 31 260 3587/8350/4557 Facsimile: +27 (0) 31 260 4609 Email:fl.nÞæ1Èukzn.acza I suruanrrfiukzn.ac.2A I mohung@ukzn.ac.za

Website:www.ukzn.ac.za

APPENDIX C: Letter to the Principal

REQUEST PERMISSION LETTER TO THE PRINCIPAL

37 Amersham heights
Bamboo lane
3600
30 August 2018

Dear Principal

I, Busisiwe Mkhize presently studying towards a Masters of Education degree at the University of KwaZulu-Natal kindly request permission to conduct a research at your school.

I am in the process of conducting research for my thesis titled: **Teaching strategies used by geography teachers to teach sustainable development in Pinetown district.** I therefore humbly request you to grant me permission to conduct research at your school. The research involves geography teachers to participate. The identity of the school and participants will be protected by not exposing their names or the school's name. I will hold interviews at a time and date that is convenient for the participants, approximately 30-45 minutes. Participation is voluntary and the participants will be free to withdraw at any point without negative consequences. I undertake to uphold the autonomy of participants. Participants will be asked to complete consent forms. In the interest of the participants, feedback will be given to them during the end of the study. The interview will be recorded. Data and all documents will be incinerated once the study has been completed and submitted.
The information will be treated with the strictest confidentiality and will be used for purpose of the study.

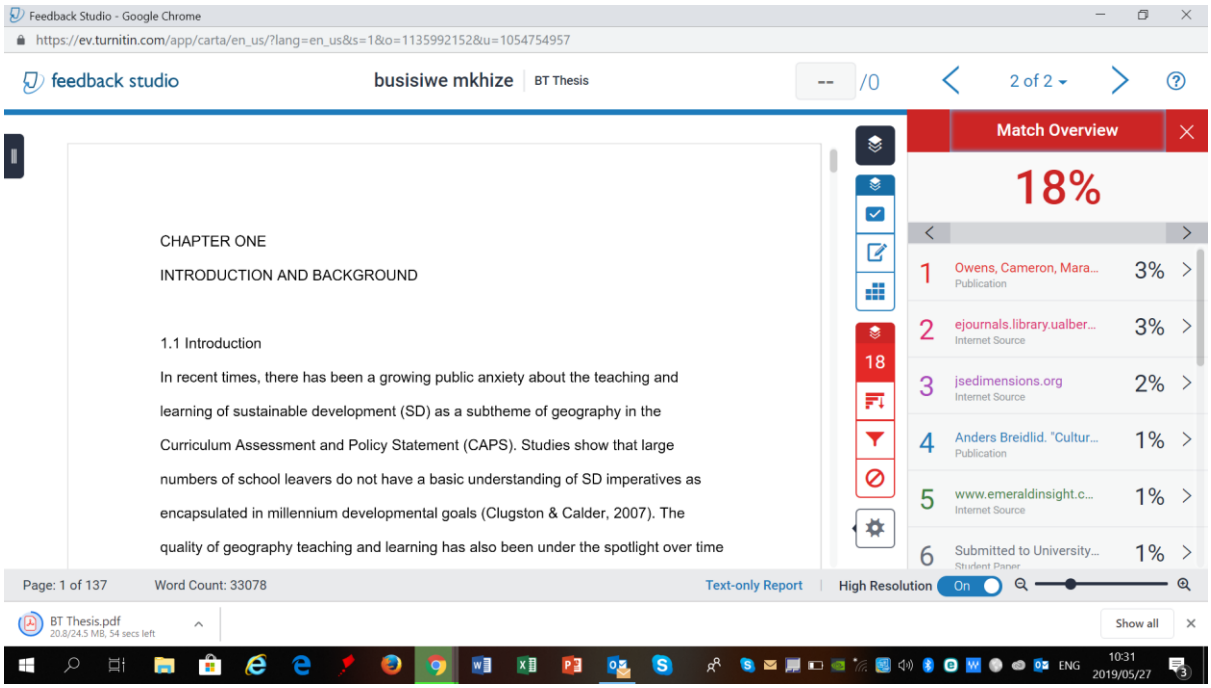
For more information and any questions about this study, you may contact me as follows:
Cell: 076 904 3216
Email: mabeebm01@gmail.com
My supervisors details: D r Mncube

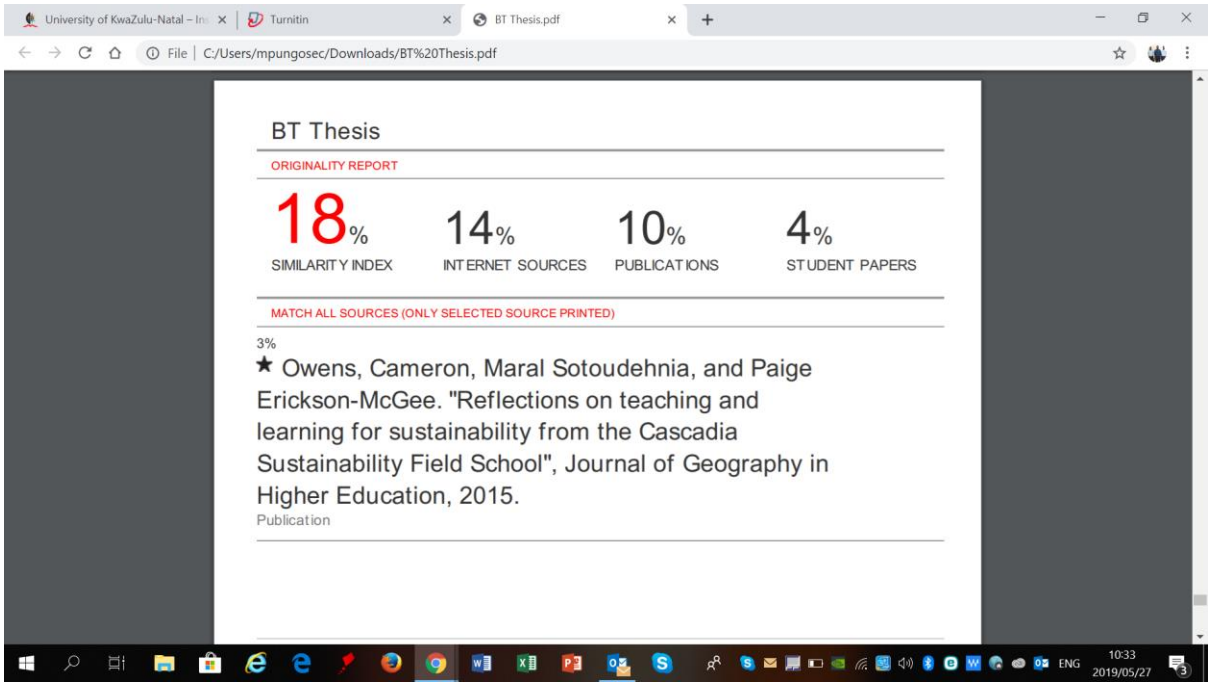
College of Humanities

School of Education: University of KwaZulu-Natal

Tel: 031 260 2494: Email: mncubed@ukzn.ac.za

APPENDIX D: Turnitin report for the thesis



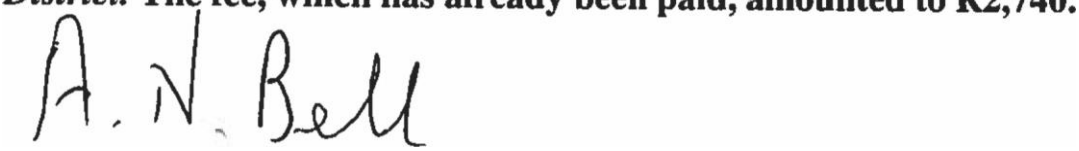


APPENDIX E: Certificate from the editor

INVOICE (1 June 2019)

This invoice is presented in respect of my editing of Ms. Busisiwe Temperence Mkhize's Master's dissertation for the Department of Social Sciences Education at the University of KwaZulu-Natal, entitled Teaching Strategies Used by Geography Teachers to Teach Sustainable Development in Pinetown

District. **The fee, which has already been paid, amounted to R2,740.**



A.N. Bell BA(Hons) (Cape Town) MA (Rhodes)
Research Associate, University of Zululand
Editorial Consultant, Echoing Green Press (Fish Hoek)
Th.: 072 237 6617
Email: alannigelbe11123@gmail.com

APPENDIX F: Letter to the participants

INFORMATION SHEET AND CONSENT TO PARTICIPATE IN RESEARCH

Date: 30 August 2018

Dear Sir/ Madam

I am Busisiwe Mkhize and I am conducting a research as a requirement at the University of KwaZulu-Natal towards a Degree of Masters of Education degree. The title of the research is "**Teaching strategies used by geography teachers to teach sustainable development**." The objectives of the study are:

1. To explore the different strategies that teachers use to teach sustainable development.
2. To understand how teachers use the teaching strategies to teach sustainable development.
3. To understand why teachers use the teaching strategies to teach sustainable development.

- The study will focus on teachers. This letter intends to elucidate the purpose of the study and to request your participation in the study.
- Your confidentiality is guaranteed as your inputs will not be attributed to you in person, but reported only as a population member opinion.
- The interview may last for about an hour and may be split into two depending on your preference.
- Any information given by you cannot be used against you and data collectedwill be used for purposes for this research only.
- Data will be stored is secure storage and destroyed after five years.
- You have a choice to participate, not participate or stop participating in the research. You will not be panalized for taking such action
- Your involvement is purely for academic purposes only, ans there are no financial benefits involved.
- If you are willing to be interviewed, please indicate by ticking where applicable.

	Willing	Not willing
Audio equipment		
Photographic equipment		
Video equipment		

In the event of any problems or concerns/questions you may contact the researcher on the following contact details: 076 904 3216 or mabeebm01@gmail.com or the UKZN Humanities & Social Sciences Research Ethics Committee, contact details as follows:

HUMANITIES & SOCIAL SCIENCES RESEARCH ETHICS ADMINISTRATION

Research Office, Westville Campus

Govan Mbeki Building

Private Bag X 54001

Durban

4000

KwaZulu-Natal, SOUTH AFRICA

Tel: 27 31 2604557- Fax: 27 31 2604609

Email: HSSREC@ukzn.ac.za

CONSENT

I _____ have been informed about the study entitled: **TEACHING STRATEGIES USED BY GEOGRAPHY TEACHERS TO TEACH SUSTAINABLE DEVELOPMENT IN THE PINETOWN DISTRICT** by Busisiwe Mkhize.

I understand the purpose and procedures of the study.

I have been given an opportunity to answer questions about the study and have had answers to my satisfaction.

I declare that my participation in this study is entirely voluntary and that I may withdraw at any time without affecting any of the benefits that I usually am entitled to.

I have been informed about any available compensation or medical treatment if injury occurs to me as a result of study-related procedures.

_____ _____

Signature of Participant **Date**

APPENDIX G: Interview schedule

One-on-one semi-structured interview

Question 1:	*Are you qualified to teach geography?*
Sub-questions	1. What informal rationale/reason made you choose to teach geography? 2. Were you trained on how to teach different topics in the geography curriculum?

Question 2:	*What do you understand by the concept of sustainable development? (content)*
Sub-questions	1. What do you think sustainable development entails? 2. What values do you think sustainable development encompasses? 3. How do you think sustainable development should be practised with in the school environment?

Question 3:	*What are the Different teaching strategies that you use to teach sustainable development? (content)*
Sub-questions	1. Are those teaching strategies effective? 2. What class activities are designed to enhance teaching and learning?

Question 4:	*How do you think sustainable development should be taught? (content)*
Sub-question	1. Do you include any practical's when teaching sustainable development? 2. Do you feel responsible for ensuring that sustainable development is taught effectively?

Question 5:	*In which place do you find conducive for you to teach sustainable development? (location/environment)*
Sub-questions	1. Is the classroom suitable to unpack the content of sustainable development? substantiate

	2. How do you maintain discipline in the place where you teach this concept of sustainable development? 3. What is the number of children in your geography class? Does the number of children in your class have an impact on how you deliver your lessons?

Question 6:	*Have you initiated any sustainable development activities within the school environment? (goals)*
Sub-questions	1. Are there any recycling measures initiated within the school premises? Elaborate 2. Do your colleagues re-enforce values in children to take care of themselves and their school environment?

Question 7:	*Why do you use those strategies that you use to teach sustainable development? (content)*
Sub-questions	1. What are your aims of teaching sustainable development? 2. What are the objectives of teaching sustainable development? 3. Are there any challenges that you encounter when teaching sustainable development? 4. What are the different activities that you use to assess sustainable development?

Question 8:	*How much time do you think is efficient for you to teach sustainable development? (time)*
Sub-question	1. Do you think it is necessary to practice sustainability during your spare time?

Question 9:	*How do you integrate pedagogical content knowledge into teaching sustainable development? (teacher's role)*
Sub-questions	1. How do you link sustainable development to learner's prior knowledge? 2. Are there any ethical values that you integrate when you are teaching sustainable development?

APPENDIX H: Reflective activity

Question 1: Are you qualified to teach geography?
Answer:
Question 2: What do you understand by the concept of sustainable development? (content)
Answer:
Question 3: What are the Different teaching strategies that you use to teach sustainable development? (content)
Answer:
Question 4: Why do you use those strategies that you use to teach sustainable development? (content)
Answer:
Question 5: How do you think sustainable development should be taught? (content)
Answer:
Question 6: How do you integrate pedagogical content knowledge into teaching sustainable development? (teacher's role)
Answer:
Question 7: What are the resources that you use to teach sustainable development? (resources)
Answer:
Question 8: How much time do you think is efficient for you to teach sustainable development? (time)
Answer:
Question 9: Have you initiated any sustainable development activities within the school environment? (goals)

Answer:

APPENDIX I: Observation sheet

Control sheet	**Yes**	**No**
1. Are there any recycling measures that are implemented around the school? e.g. bins		
2. Are the posters about sustainable development in the classroom?		
3. Are learners empowered to practice sustainable development? E.g. sustainability clubs		
4. Is the school a litter-free zone? E.g. cleanness of the school		
5. Is the teacher engaging learners in sustainability concepts?		
6. Does the teacher use suitable resources to teach sustainable development?		
7. Does the teacher has pedagogical content-knowledge towards teaching sustainable development		